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JOINT TASK FORCE ONE

ARMY GROUND GROUP
(TASK GROUP 1.4)

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By Authority of JOINT CHIEFS OF STAFF ACTION OF 15 APRIL 1949
By *White* Date 16 Feb 50

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FINAL REPORT

OF

ATOMIC BOMB TESTS

27 January 1946 to 30 September 1946

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VOLUME FOUR

OF

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Director
Defense Atomic Support Agency
Washington, D. C. 20301

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Submitted By:

J.D. FREDERICK
Colonel, Infantry
CTG 1.4

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JOINT TASK FORCE ONE

ARMY GROUND GROUP
(TASK CROSSROADS)

TASK UNIT 1.4.3 (ORDNANCE)

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By Authority of Joint Chiefs of Staff Action of 15 April 1979

By John A. Bagge, Gilt Int Date 16 Feb 81

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FINAL REPORT

OPERATION CROSSROADS.

ATOMIC BOMB TESTS.

VOLUME 4, APPENDIX

VII 143

22 January 1946 to 30 September 1946

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APPENDIX VII

TO

ARMY GROUND GROUP REPORT

(14) XRD-152

Submitted By:

S. F. Musselman

(10)

S. F. MUSSELMAN

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ARMY GROUND GROUP
(TASK GROUP 1.4)

Director
Defense Atomic Support Agency
Washington, D. C. 20301

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By Authority of Joint Chiefs of Staff Action of 12 April 1947
By *John W. B. [Signature]* Date *16 July 51*
A.F.S.W. [Signature]

INDEX OF FINAL REPORT

VOLUME ONE	General Report Appendix I Appendix II Appendix III Appendix IV	Commander Task Group 1.4 General Data Report of Liaison Officer, Transportation Corps Report on Structures Chronological Record
VOLUME TWO	Appendix V	Report of Commander Task Unit 1.4.1 (Engineer)
VOLUME THREE	Appendix VI	Report of Commander Task Unit 1.4.2 (Signal)
VOLUME FOUR	Appendix VII	Report of Commander Task Unit 1.4.3 (Ordnance)
VOLUME FIVE	Appendix VIII	Report of Commander Task Unit 1.4.4 (Chemical)
VOLUME SIX	Appendix IX	Report of Commander Task Unit 1.4.5 (Quartermaster)
VOLUME SEVEN	Appendix X	Report of Commander Task Unit 1.4.6 (Air)

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By Authority of JOINT CHIEFS OF STAFF ACTION OF 15 APR 1947
By John G. Beggs, Capt Inf TASK GROUP 1.4.3
AFSWIP (ARMY GROUND GROUP)

TASK UNIT 1.4.3
(ORDNANCE)

TABLE OF CONTENTS

	Page
Section I INTRODUCTION - - - - -	1
Section II CONCLUSIONS - - - - -	8
Section III RECOMMENDATIONS - - - - -	12
Section IV DESCRIPTION OF MATERIALS AND TEST CONDITIONS - - -	14
A. List of Ordnance Items Displayed - - - - -	14
B. Disposition, Method of Securing and State of Preparation of Test Items for Test Able. - - - - -	23
1. General - - - - -	23
2. Artillery - - - - -	23
3. Tank and Automotive - - - - -	28
4. Fire Control - - - - -	37
5. Small Arms and Aircraft Armament - - - - -	42
6. Ammunition and Explosives - - - - -	45
C. Disposition, Method of Securing, State of Preparation of Test Items for Test Baker. - - - - -	55
Section V ANALYSIS OF TEST RESULTS - - - - -	66
A. General - - - - -	66
B. Artillery - - - - -	66
C. Tank and Automotive - - - - -	71
D. Fire Control - - - - -	75
E. Small Arms and Aircraft Armament - - - - -	84
F. Ammunition and Explosives - - - - -	88
G. Test Baker - - - - -	91

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SECTION I

INTRODUCTION

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JOINT TASK FORCE ONE
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FINAL REPORT

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Classification (Cancelled) (Changed to)

- I. INTRODUCTION By Authority of Joint Chiefs of Staff Action of 12 April 1947
A. OBJECT OF TEST The object of Testing Army Ordnance Materiel and Ammunition in Test Able of Operation Crossroads was:

1. To determine the extent and character of damages inflicted by the bomb under the prevalent test conditions.
2. To assess the significance of damages in terms of an Army field operation.
3. To determine whether changes in the design of Ordnance materiel, ammunition, and/or packaging are necessary to minimize or overcome the effects of an Atomic Bomb.
4. To collect technical data which may prove valuable to the future design of Ordnance materiel and ammunition.

B. CONDITIONS OF TEST

1. The selection of ordnance equipment to be displayed in Test Able was hampered from the very beginning by the limited availability of space on the target ships. To use this space with maximum efficiency it was necessary to reduce the kinds and quantity of display samples to the minimum, giving careful consideration to the selection of test items to the end that only one of each type of up-to-date standard equipment would be displayed. The War Department General Staff, Army Ground Forces, Army Air Forces, the Army Technical Services and the Navy Department co-operated in the final selection to eliminate duplications and reduce the weight and bulk of test samples to be displayed. To facilitate control and preclude duplication it was agreed that the Ordnance Unit would handle all explosives and demolition materials of the Corps of Engineers. The 44 materiel items and 175 ammunition items selected present to some degree every feature and type of design used in modern Army weapons, combat and transport vehicles, electronic and optical fire control equipment, ammunition and explosives.

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2. In an effort to obtain a graduated effect on each test item, in terms of radius from the bomb, identical sets of materiel items were displayed on the USS Arkansas, USS Nevada, USS Pennsylvania, and USS Saratoga, which ships were located in the target array at the following approximate distances from the point of burst of the bomb:

USS ARKANSAS	600 yards
USS NEVADA	600 yards
USS PENNSYLVANIA	1600 yards
USS SARATOGA	2300 yards

To conform to the safety regulations governing the exposure of army ammunition and explosives, five small ships were chosen for the display of these items, as follows:

YOG-83	1000 yards
LST-52	1500 yards
LST-661	2300 yards
LST-220	3300 yards
LST-545	4100 yards

The various test samples were arranged over the available space on the weather decks of the ships; materiel items being located in accordance with the load capacity of the parts of the deck, and ammunition items being segregated by explosive classification and grouped and located with regard to established safety distances. Figures 1 and 2 illustrate a typical materiel layout on a battle-ship and Fig. 3 the layout on the aircraft carrier, USS Saratoga. A typical ammunition display is shown in Fig. 4. Deck space aboard ships was so limited that test items were distributed over all portions of the deck for the test. This caused many items to be placed in positions where they were masked from direct exposure to the bomb by the ship's superstructure, turrets, and/or armor shields. As a result of this condition 50% of all materiel test items were not directly exposed to the heat and blast of the atomic bomb. However, only a very small percentage of ammunition test items were shielded.

3. The materiel test items were displayed in a condition of battle readiness, except that motor vehicles were completely drained of gasoline and all weapons were without ammunition. All items were securely lashed to weather decks to prevent their being

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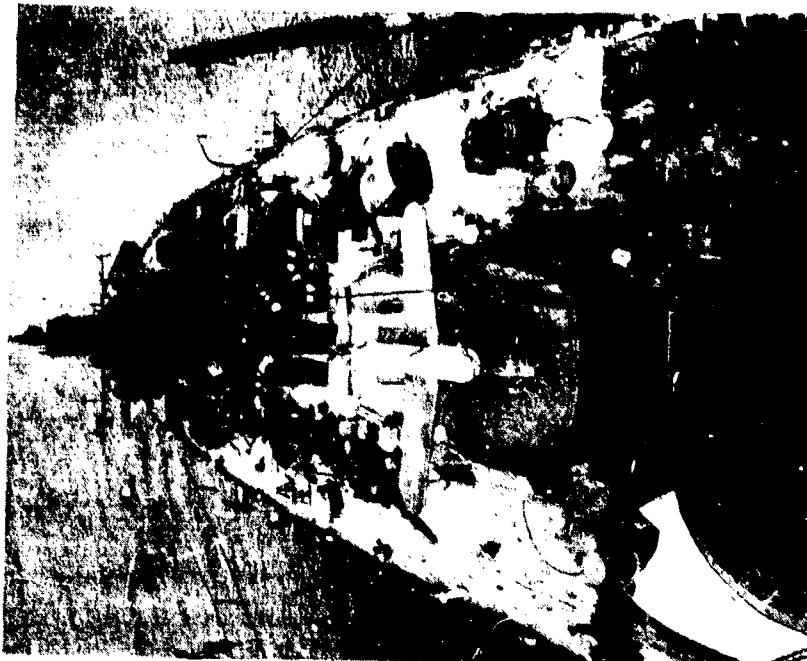


Fig. 2 - Typical view of Ordnance materiel displayed on a battleship.



Fig. 1 - Typical view of Ordnance materiel displayed on a battleship.

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Fig. 3 - Typical view of Ordnance materiel displayed on an aircraft carrier.



Fig. 4 - Typical view of Ordnance ammunition displayed on an LST.

4
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blown overboard by blast pressure. Ammunition test items were displayed bare, in packages, and in shipping containers.

4. Test Able of Operation Crossroads occurred at 0905 hours, 1 July 1946, at Bikini Atoll, Marshall Islands. The atomic bomb was released from a B-29 bomber and burst several hundred feet in the air above the target array. The actual point of burst (horizontal projection) of the bomb was six hundred yards from the intended point of burst, the USS Nevada. Ordnance inspection personnel boarded the USS Pennsylvania and USS Saratoga 2 July 1946, but radioactivity of the ships and surrounding vicinity prevented inspection personnel from boarding the two most damaged battleships, the USS Arkansas and USS Nevada, until the morning of 4 July 1946.

C. TEST BAKER

1. The US Army participation in Test Baker was intended to determine the effects of a shallow water Atomic Bomb explosion on equipment arrayed to simulate an Amphibious landing on Bikini Island. It was expected that with equipment well dispersed, any damage sustained would indicate a progressive effect of an Atomic Bomb shallow water explosion on Ordnance equipment at distances ranging from two and one half to three and one half miles. Army supplies and materiel in general and Ordnance equipment in particular were extremely limited for participation in this type of test because only materiel that had received little or no damage from Test Able, were available for display. The Ordnance display was limited to 24 major items (see Appendix F, Master list of Test Baker Materiel). In addition to the above there were 15 items of heavy Ordnance on the target ships USS Arkansas, USS Nevada, USS Pennsylvania and USS Saratoga. The materiel remained on these ships through test Baker because lifting facilities were not available to place it on ships bound for the United States or on small craft for movement to Bikini Island. (See Appendix G. Test Baker Materiel on Major Ships).

2. On 25 July 1946, at 0835 hours, the Test Baker Atomic bomb was detonated. The phenomena that followed the explosion was witnessed by all Ordnance personnel from a distance approximately ten miles from the center of the target array. Because of radioactivity on ships, in the water, and on Bikini Island it was five days before an Ordnance officer with an initial landing party was allowed to land on Bikini Island and go aboard craft on the beach. On 31 July 1946 the island and boats on the beach were declared safe for inspection of Army equipment.

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D. DEFINITIONS

For clarity and consistency several words and descriptive phrases, defined below, have been used in this report to indicate conditions, situations and/or incidents associated solely with the atomic bomb tests.

1. Masking or shielding: Terms used interchangeably to indicate that the subject item has some object intervening between it and the atomic bomb burst. Does not imply that the test item is inclosed.
2. Directly exposed: Indicates that a test item had no shielding or masking between it and the atomic bomb burst.
3. Primary damage: Damage caused solely by direct action of atomic bomb forces.
4. Secondary damage: Damage resulting from some force, object or condition other than the atomic bomb.
5. Irreparably damaged: Those items not reasonably repairable by third echelon maintenance.
6. Primary test item: One of 44 major test items originally selected by Headquarters, Army Ground Forces and the Ordnance Department for display.
7. Secondary test item: Those individual component items of equipment which are employed to make a major combination.
8. Foreign object: An object not directly associated with the item under discussion, usually in describing secondary damage.

E. PERSONNEL

This report was prepared by:

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SECTION II

CONCLUSIONS

7
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II. CONCLUSIONS

It is concluded:

A. GENERAL

1. ~~That~~ Army ordnance materiel and ammunition is not an economical target for an atomic bomb.
2. ~~That~~ the mechanical damage inflicted on ordnance materiel becomes relatively insignificant when compared to the casualties from the physiological and psychological effect of the atomic bomb on operating personnel. *Eighty-six percent*
3. ~~That~~ 86% of the damage to Ordnance materiel resulted from the blast pressure of the air burst atomic bomb.
4. ~~That~~ there was no lasting radiological effect on Ordnance materiel or ammunition from the air burst atomic bomb.
5. ~~That~~ masking, however slight, materially reduces the damaging effect of the flash heat of the atomic bomb.
6. ~~That~~ the circumstances under which ordnance test items were displayed in Test Able resulted in the following unnatural conditions:
 - a. Non-combat vehicles suffered more damage as a result of their rigid lashings than would have occurred as a result of their being naturally rolled, skidded, or upset by blast pressure on normal terrain.
 - b. ~~That~~ the majority of light weight materiel items and ammunition items suffered less damage as a result of their rigid lashings than would occur in a field operation, *and*
 - c. Quantities of sand, dust, and rocks, traveling at high velocity from the effects of blast pressures, which probably would have caused damage to exposed lenses, gas engines, radiators, bearings were completely absent.

B. MATERIEL

1. That the atomic bomb did not impair the usual functions nor the ability to satisfy the basic military requirements of guns, gun carriages, small arms or tanks exposed at a distance of 600 yards and beyond.
2. That fire control equipment, both optical and mechanical,

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are more vulnerable to the atomic bomb than the basic artillery, small arms or armored vehicles with which they are employed.

3. That fire control and automotive materiel constructed of relatively large areas of light gage metal will be extensively damaged within 1000 yards from an atomic bomb.

4. That fire control instruments employed on tripods (Director M7, Aiming Circle, Height Finder, Range Finder, etc.) will be damaged more by being violently thrown to the ground by the blast than from the direct effect of heat and pressure of the atomic bomb.

5. That items of ordnance equipment ordinarily carried on the person, such as watches, binoculars, and gunners quadrants, will not be damaged by an atomic bomb at distances greater than 600 yards.

6. That the Director M9 will be damaged beyond economical repair by the blast of an atomic bomb at distances within 600 yards.

7. That masking of transport and amphibious vehicles from direct exposure to an atomic bomb will not prevent serious damage from velocity pressures at distances within 600 yards.

8. That the hatches on tanks will be violently blown open by the effects of the atomic bomb at distances within 600 yards and crew personnel will be injured by shock and blast.

9. That the inspection covers between the fighting compartment and the engine compartment of the Tanks, M24, and M26 will be violently torn loose by the pressures of an atomic bomb at distances within 1600 yards.

10. That radio aeriels of the whip type used on combat vehicles are generally broken by the blast of an atomic bomb within a 600 yard radius.

11. That a shallow water explosion of an atomic bomb had no damaging effect on Ordnance equipment placed in a simulated amphibious landing at a distance of 4000 yards or more. No ordnance equipment in landing craft was displayed closer.

C. AMMUNITION

1. That the following damage to ammunition items will occur at a distance 1000 yards from an atomic bomb:

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a. Bare individual rounds of artillery and small arms ammunition will suffer little damage to metal parts.

b. Metal and wooden packing boxes, though still serviceable, will be heavily scorched and/or charred. The nomenclature, in the burned area will be obliterated.

c. Fiber containers will be sufficiently damaged to destroy their moisture proof characteristics.

2. That ammunition packed in shipping containers will not be ignited or detonated by the atomic bomb at a distance of 1000 yards or beyond.

3. That exposed bag powder charges will ignite from the heat of the atomic bomb at a distance within 1500 yards.

4. That exposed powder increments of 81mm mortar shell will be ignited by heat at a distance of 2300 yards but the ignition cartridges will remain serviceable at a distance of 1000 yards.

D. COMPONENT MATERIALS

1. That the rubber of automotive tires and electrical cable appears unaffected by direct exposure to the atomic bomb at a distance of 600 yards.

2. That cements used in optical lens systems may fail from the heat effects of the atomic bomb within a distance of 1600 yards.

3. That the paints used on ordnance equipment exposed to the atomic bomb:

a. Reacted in radically differing manners under the same exposure.

b. Were generally scorched, blistered or discolored in varying degrees at distances between 600 and 2300 yards.

4. That, although most exposed plastic parts and surfaces are variously subject to searing, warping and melting under the radiant heat of the atomic bomb within 1600 yards range, some plastic compounds remained unaffected under identical exposure.

SECRET

SECTION III

RECOMMENDATIONS

11
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III. RECOMMENDATIONS

A. It is recommended that a new atomic bomb test over land be made to determine the effects of a strategic bombing of conventional and advanced types of above ground and under ground buildings and structures, with a secondary object of determining the tactical effect on military equipment.

B. That grave consideration be given to the velocity pressures developed by the Atomic Bomb in the future structure design of all Ordnance materiel.

C. It is recommended that design studies be initiated to:

1. Decrease the vulnerability to the blast and heat of the atomic bomb of fire control equipment normally mounted on artillery, combat vehicles, and small arms.

2. Develop optical cements capable of withstanding the heat of the atomic bomb.

3. Prevent the opening of tank hatches and inspection doors by blast of an atomic bomb.

4. Prevent the loss of identifying nomenclature on packaged ammunition by the action of heat of the atomic bomb.

5. Reduce and/or relieve flat surface areas of ordnance materiel presented to blast and strengthen such surfaces by the use of rigid and reinforced paneling in place of light gage metal sheeting.

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SECTION IV

**DESCRIPTION OF MATERIALS AND
TEST CONDITIONS**

**13
SECRET**

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IV. DESCRIPTION OF MATERIEL AND TEST CONDITIONS.

A. LIST OF ORDNANCE TEST ITEMS DISPLAYED

1. Materiel displayed for Test Able.

ITEM NO.	NOMENCLATURE
1.	Carbine, Cal. 30, M2
2.	Gun, Machine, Cal. 30, M1917A1 w/Mount, M1917A1
3.	*Gun, Machine, Cal. 50, HB, M2, (From Mount, Multiple, Machine Gun M45)
4.	*Gun, Machine, Cal. 50, HB, M2
5.	*Gun, Machine, Cal. 50, HB, M2
6.	*Gun, Machine, Cal. 50, HB, M2
7.	Gun, Machine, Cal. 60, T17E3
8.	Gun, Submachine, Cal. 45, M3A1
9.	Helmet, Steel, M1
10.	Holster, Pistol, M1916
11.	Knife, Trench, M4 w/Scabbard M8A1
12.	Launcher, Rocket, 2.36", M9E2
13.	Pistol, Automatic, Cal. 45, M1911A1
14.	Rifle, Browning Automatic, M1918A2
15.	Rifle, Recoilless, 75mm, M20.
16.	Rifle, US, Cal. 30, M1C
17.	Shotgun, 12 gage, Riot Type, w/lug
18.	Gun, Automatic, 20mm, M3
19.	Gun, 75mm, AC, M10 w/Mount M10 and Feed Mechanism M4.
20.	Paracaission, M9A2.
21.	Parachest, M8A1
22.	Gun, 40mm, M1, w/Mount, Gun, 40mm, AA, M2A1.
23.	Gun, 90mm, AA, M2, w/Mount, Gun, 90mm, AA, M2.
24.	Gun, 155mm, M2, w/Carriage, Gun 155mm, M1A1
25.	Howitzer, 105mm, M2A1, w/Carriage, Howitzer, 105mm, M2A2
26.	Launcher, Rocket, 4.5", T66E2, Complete.
27.	Mortar, 81mm, M1 w/Mount, Mortar, 81mm, M4
28.	Binocular, M15A1
29.	Circle, Aiming, M1
30.	Clock, Message Center, M1
31.	Director, M7A1B1
32.	Director, M9A2, w/Trailer, M14. Note 1.
33.	Finder, Height, M1A1. Note 2.
34.	Finder, Range, M7
35.	*Mount, Periscope, T-107, (From Tank, Light, M24)
36.	*Mount, Telescope, M21A1, w/Instrument Light (From Carriage, Howitzer, 105mm, M2A2)
37.	*Mount, Telescope, M65 (From Tank. Light, M24)

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<u>ITEM NO.</u>	<u>NOMENCLATURE</u>
38.	*Oil Gear, M3, Elevation (From Carriage, 40mm, AA, M2A1)
39.	*Periscope, M4A1 (From Appropriate Vehicle)
40.	*Quadrant, Elevation, M9 (GMC, M36)
41.	*Quadrant, Gunners, M1, Comp. w/case (From Carriage, Gun Motor, M36)
42.	*Quadrant, Range, M4, (From Carriage, Howitzer, 105mm, M2A2)
43.	*Sight, M4, (From Mortar, 81mm M1)
44.	*Sight, Computing, M7A1, (From Carriage, Gun, 40mm, M2A1)
45.	System, Cable, M1
46.	*Telescope, M71 (From Tank, Light, M24)
47.	Telescope, T108E2
48.	Telescope, BC, M65
49.	*Telescope, Elbow, M7 (From Finder, Height, M1)
50.	*Telescope, Elbow, M16A1 w/Mount & Instrument Light (From Carriage, 105mm Howitzer, M2A2)
51.	*Telescope, Panoramic, M12, (From Carriage, Gun, 155mm)
52.	Unit, Generating, M7A1, w/Trailer, M7
53.	Watch, Pocket, Railroad type.
54.	Watch, Wrist
55.	Car, Armored, Light, M8
56.	Carriage, Motor, Multiple Gun, M16
57.	Carriage, Motor, 90mm Gun, M36
58.	Carrier, Cargo, M29C (Amphibian)
59.	Tank, Heavy, M26
60.	Tank, Light, M24
61.	Truck, 1/4 Ton, 4x4
62.	Truck, 3 1/2 Ton, 6x6, Amphibian, (GMC Model DUKV-353)
63.	Truck, Auto Repair, 2 1/2 Ton, 6x6, M8A1

*Asterisk denotes secondary items.

The following Notes indicate a difference in model number from that indicated on the Master List, the ship on which the model differs is included.

- Note 1. Director, M9A1, w/Trailer, M13-
USS NEVADA.
- Note 2. Finder, Height, M1 - USS ARKANSAS

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2. Ammunition Displayed for Test Able.

<u>Item No.</u>	<u>Nomenclature</u>	<u>Quan Disp</u>	<u>Method of Layout</u>	<u>Expl Co.</u>
1	Cartridge, Ball, Cal..30, M2	10 ea	bare	A
2.	Cartridge, Ball, Cal..30, M2	100	mtl. belt	A
3.	Cartridge, Ball, Cal..30, M2	250	mg. belt	A
4.	Cartridge, Ball, Cal..30, M2	20	carton	A
5.	Cartridge, Ball, Cal..30, M2	240	box	A
6.	Cartridge, AP, Cal..50, M2	10	bare	A
7.	Cartridge, AP, Cal..50, M2	55	mtl. belt	A
8.	Cartridge, AP, Cal..50, M2	10	carton	A
9.	Cartridge, AP, Cal..50, M2	265	box	A
10.	Cartridge, Tracer, Cal..50, M10	10	bare	A
11.	Cartridge, Tracer, Cal..50, M10	50	mtl. belt	A
12.	Cartridge, Tracer, Cal..50, M10	10	carton	A
13.	Cartridge, Tracer, Cal..50, M10	350	box	A
14.	Shell, Shotgun, All Brass, 12 Ga. No. 00 Buck, M19	10	bare	A
15.	Shell, Shotgun, All Brass, 12 Ga. No. 00 Buck, M19	25	carton	A
16.	Shell, Shotgun, All Brass, 12 Ga. No. 00 Buck, M19	120	box	A
17.	Shell, Shotgun, 12 Ga., Paper, #8C.S.	10	bare	A
18.	Shell, Shotgun, 12 Ga., Paper, #8C.S.	10	carton	A
19.	Shell, Shotgun, 12 Ga., Paper, #8C.S.	120	box	A
20.	Cartridge, Ball, Cal. 45, M1911	14	mag	A
21.	Cartridge, Ball, Cal. 45, M1911	50	carton	A
22.	Cartridge, Ball, Cal. 45, M1911	600	box	A
25.	Cartridge, TP,M99 (T24), 20mm. AC Gun	5	bare	A
26.	Cartridge, TP,M99 (T24), 20mm AC Gun	110	box	A
27.	Cartridge, TP,M306 (T22), w/Fuze, Dummy, T126 for 57mm Rifle.	1	bare	C
28.	Cartridge, TP,M306 (T22), w/Fuze, Dummy, T126 for 57mm Rifle	1	mtl cont	C
29.	Cartridge, TP,M306 (T22), w/Fuze, Dummy, T126 for 57mm Rifle	2	box	C
30.	Shell, HE (1t) M43A1, 81 Mortar w/o Fuze	1	bare	C
31.	Shell, HE (1t) M43A1, 81 Mortar	1	fil cont.	C

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<u>Item No.</u>	<u>Nomenclature</u>	<u>Quan /Map</u>	<u>Method of Layout</u>	<u>Expl. Gp.</u>
32	Shell, HE (1t) M43A1, 81mm Mortar w/o Fuse	4	mtl. cont.	C
33	Shell, HE (1t) M56, 81 mm Mortar w/o Fuse	1	bare	C
34	Shell, HE (1t) M56, 81mm Mortar w/o Fuse	1	fib. cont.	C
35	Shell, HE (1t) M56, 81mm Mortar w/o Fuse	1	mtl. cont.	C
36	Shell, Smoke, WP, M57, 81mm Mortar w/o Fuse	1	bare	B
37	Shell, Smoke, WP, M57, 81mm w/o Fuse	1	fib. cont.	B
38	Shell, Smoke, WP, M57, 81mm Mortar w/o Fuse	1	mtl. cont.	B
39	Shell, Smoke, FS, M57, 81mm w/o Fuse	1	bare	A
40	Shell, Smoke, FS, M57, 81mm w/o Fuse	1	fib. cont.	A
41	Shell, Smoke, FS, M57, 81mm w/o Fuse	1	mtl. cont.	A
42	Shell, semi-fixed, HE, M1, 105mm Howitzer w/o Fuse	2	bare	C
43	Shell, semi-fixed, HE, M1, 105mm Howitzer w/o Fuse	1	mtl. cont.	C
44	Shell, semi-fixed, smoke, WP, M60 105mm Howitzer w/o Fuse	2	bare	B
45	Shell, semi-fixed, smoke, WP, M60 105mm Howitzer w/o Fuse	1	mtl. cont.	B
46	Charge, Prop, 155mm Guns, M1, M1A1.	2	bare	B
47	Charge, Prop, 155mm Guns, M1, M1A1	1	fib. cont.	B
48	Charge, Prop, 155mm Guns, M1, M1A1	1	mtl. cont.	B
49	Fuse, TM., M43A3, w/Booster M20A1	1	bare	C
50	Fuse, TM., M43A3, w/Booster M20A1	1	fib. cont.	C
51	Fuse, TM., M43A3, w/Booster M20A1	23	box	C
52	Fuse, TM., M43A1, w/o Booster	1	bare	A
53	Fuse, TM., M43A1, w/o Booster	1	fib. cont.	A
54	Fuse, TM., M43A1, w/o Booster	48	box	A
55	Fuse, P.D., M48A2, w/Booster M21A1	1	bare	C
56	Fuse, P.D., M48A2, w/Booster M21A1	1	fib. cont.	C

SECRET

<u>Item No</u>	<u>Nomenclature</u>	<u>Quan Disp</u>	<u>Method of Layout</u>	<u>Expl. Co.</u>
57	Fuze, P.D., M48A2, w/Booster M21A1	23	box	C
58	Fuze, P.D., M48A2, w/o Booster	1	bare	A
59	Fuze, P.D., M48A2, w/o Booster	2	fib. cont.	A
60	Fuze, P.D., M48A2, w/o Booster	48	box	A
61	Fuze, P.D., M52A1, w/Booster	1	bare	C
62	Fuze, P.D., M52A1, w/Booster	1	fib. cont.	C
63	Fuze, P.D., M52A1, w/Booster	23	box	C
64	Fuze, P.D., M52A1, w/Booster	1	bare	A
65	Fuze, P.D., M52A1, w/o Booster	1	fib. cont.	A
66	Fuze, P.D., M52A1, w/o Booster	48	box	A
67	Fuze, T&SQ, M54, w/o Booster	1	bare	A
68	Fuze, T&SQ, M54, w/o Booster	1	can	A
69	Fuze, T&SQ, M54, w/o Booster	23	box	A
70	Fuze, T&SQ, M55A3, w/Booster, M21A4	1	bare	C
71	Fuze, T&SQ, M55A3, w/Booster, M21A4	1	fib. cont.	C
72	Fuze, T&SQ, M55A3, w/Booster, M21A4	23	box	C
73	Fuze, VT, T76E6, w/Booster	1	bare	C
74	Fuze, VT, T76E6, w/Booster	1	can	C
75	Fuze, VT, T76E6, w/Booster	10	box	C
76	Fuze, VT, T76E6, w/o Booster	1	bare	A
77	Fuze, VT, T76E6, w/o Booster	1	can	A
78	Fuze, VT, T76E6, w/o Booster	10	box	A
79	Fuze, Rocket, B.D. M4146 w/Booster	1	bare	C
80	Fuze, Rocket, B.D. M4146 w/o Booster	1	bare	A
81	Head, Rocket, HE, 7.2" T37, w/o Fuze	1	bare	D
82	Head, Rocket, HE, 7.2", T37, w/o Fuze	1	box	D
84	Motor, Rocket, 2.25", M43 Navy	1	bare	C
85	Motor, Rocket, 2.25", M43 Navy	7	box	C
86	Rocket, Practice, AT, 2.36", M7A3	1	bare	C
87	Rocket, Practice, AT, 2.36", M7A3	1	fib. cont.	C
88	Rocket, Practice, AT, 2.36", M7A3	1	box	C
89	Rocket, HE, AT, 2.36", M5A3F	1	bare	D
90	Rocket, HE, AT, 2.36", M5A3F	1	fib. cont.	D
91	Rocket, HE, AT, 2.36", M5A3F	6	box	D
92	Fuses, Red, M72	1	bare	B
93	Fuses, Red, M72	30	box	B

SECRET

<u>Item No</u>	<u>Nomenclature</u>	<u>Quan Disp</u>	<u>Method of Layout</u>	<u>Expl Cn.</u>
94	Signal, Aircraft, AN-M53	1	bare	B
95	Signal, Aircraft, AN-M53	132	box	B
96	Signal, Ground, High Burst, Ranging, M27	1	bare	B
97	Signal, Ground, High Burst, Ranging, M27	98	box	B
98	Flare, Ground, T9, (Red)	1	bare	B
99	Flare, Ground, T9, (Red)	30	box	B
100	Flare, Airport, T15	1	bare	B
101	Flare, Airport, T15	1	box	B
102	Flare, Aircraft, Parachute, M26	1	bare	B
103	Flare, Aircraft, Parachute, M26	1	box	B
104	Flare, Trip, Parachute, M48	1	bare	B
105	Flare, Trip, Parachute, M48	3	box	B
106	Flare, Trip, M49	1	bare	B
107	Flare, Trip, M49	15	box	B
110	Fuze, Bomb, Nose AN-M103A1, w/Booster	1	bare	C
111	Fuze, Bomb, Nose AN-M103A1, w/Booster	1	can	C
112	Fuze, Bomb, Nose AN-M103A1, w/Booster	23	box	C
113	Fuze, Bomb, Nose AN-M103A1, w/o Booster	1	bare	A
114	Fuze, Bomb, Nose, AN-M103A1 w/o Booster	1	can	A
115	Fuze, Bomb, Nose AN-M103A1 w/o Booster	23	box	A
116	Fuze, Flare, M.T., M111A2, w/Booster	1	bare	C
117	Fuze, Flare, M.T., M111A2, w/Booster	1	can	C
118	Fuze, Flare, M.T., M111A2, w/Booster	23	box	C
119	Fuze, Flare, M.T., M111A2, w/o Booster	1	bare	A
120	Fuze, Flare, M.T., M111A2, w/o Booster	1	can	A
121	Fuze, Flare, M.T., M111A2,	23	box	A
122	Fuze, Bomb, Tail, M112	1	bare	A
123	Fuze, Bomb, Tail, M112	1	can	A
124	Fuze, Bomb, Tail, M112	23	box	A
135	Fuze, Bomb, Nose, VT, T51E1 (M166) w/Booster	1	bare	C
126	Fuze, Bomb, Nose, VT, T51E1 (M166) w/Booster	1	carton	C

SECRET

<u>Item</u> <u>No.</u>	<u>Nomenclature</u>	<u>Quan</u> <u>Disp</u>	<u>Method of</u> <u>Layout</u>	<u>Expl Gp.</u>
127	Fuze, Bomb, Nose, VT, T51E1 (M166) w/Booster	4	box	C
128	Fuze, Bomb, Nose, VT, T51E1 (M166) w/o Booster	1	bare	A
129	Fuze, Bomb, Nose, VT, T51E1 (M166) w/o Booster	1	carton	A
130	Fuze, Bomb, Nose, VT, T51E1 (M166) w/o Booster	4	box	A
131	Fuze, Bomb, Tail, T57	1	bare	A
132	Fuze, Bomb, Tail, T57	1	can	A
133	Fuze, Bomb, Tail, T57	4	box	A
134	Fuze, Bomb, HD, Mk.230, w/Booster	1	bare	C
135	Fuze, Bomb, HD, Mk.230, w/Booster	1	can	C
136	Fuze, Bomb, HD, Mk.230, w/Booster	2	crate	C
137	Fuze, Bomb, HD, Mk.230, w/o Booster	1	bare	A
138	Fuze, Bomb, HD, Mk.230, w/o Booster	1	can	A
139	Fuze, Bomb, HD, Mk.230, w/o Booster	2	crate	A
140	Bomb, Demolition, 4000 Lb., AN-M56A1	1	bands	D
141	Bomb, T.I., 250 Lb., M89	1	bare	B
142	Bomb, Photoflash, 100 Lb. AN-M46	1	bare	D
143	Grenade, Hand, O/D T32 w/Fuze T1005	1	bare	D
144	Grenade, Hand, O/D T32 w/Fuze T1005	5	box	D
145	Grenade, Hand, O., Mk.3A1	1	bare	D
146	Grenade, Hand, O., Mk.3A1	49	box	D
147	Fuze, Mine, AB, Horn, T25	6	bare	A
148	Mine, AT, HE, T7, light, w/o Fuze	1	bare	D
149	Mine, AT, HE, T7, light, w/o Fuze	7	box	D
150	Mine, AT, HE, M6, heavy, w/o Fuze	1	bare	D
151	Mine, AT, HE, M6, heavy, w/o Fuze	1	crate	D
152	Mine, AT, HE, M4, w/o Fuze	1	bare	D
153	Mine, AT, HE, M4 w/o Fuze	4	box	D
154	Charge, Shaped, 15 Lb., M2A3	1	bare	D
155	Torpedo, Bangalore, M1A1	1	bare	D
156	Torpedo, Bangalore, M1A1	1	box	D
157	Cartridge, Snake, Demolition, M2	1	bare	D
158	Cartridge, Snake, Demolition, M2	1	box	D
159	Block, Demolition, TNT, 1/2 lb.	4	bare	D
160	Block, Demolition, TNT, 1/2 lb.	4	box	D

SECRET

<u>Item No.</u>	<u>Nomenclature</u>	<u>Quan Disp</u>	<u>Method of Layout</u>	<u>Expl. Gr.</u>
161	Block, Demolition, M2, 2 1/2 lb	2	bare	D
162	Block, Demolition, M2, 2 1/2 lb	2	box	D
163	Block, Demolition, M3, 2 1/4 lb	2	bare	D
164	Block, Demolition, M3, 2 1/4 lb	2	box	D
165	Cratering Explosive, Ammonium Nitrate	1	can	D
166	Dynamite, 40%	3	bare	D
167	Dynamite, 40%	3	box	D
168	Cap, Blasting, Electric No. 8	6	bare	D
169	Cap, Blasting, Electric No. 8	12	carton	D
170	Cap, Blasting, Non-Electric #8	6	bare	D
171	Cap, Blasting, Non-Electric #8	12	carton	D
172	Cord, Detonating	4 ft	bare	A
173	Cord, Detonating	46 ft	spool	A
174	Detonators, Concussion, Type T1	1	Suspended bare in 5 feet of water	A
175	Detonators, Concussion, Type T1	1	can	A
186	Cartridge, Incendiary, Cal..50, M23	10	bare	A
187	Cartridge, Incendiary, Cal..50, M23	60	mtl. belt	A
188	Cartridge, Incendiary, Cal..50, M23	10	carton	A
189	Cartridge, Incendiary, Cal..50, M23	120	box	A
190	Rocket, Practice, 4.5", M17,SS		bare	
191	Rocket, Practice, 4.5", M17,SS		mtl. cont.	
192	Set, Demolition, No. 2, Engr. Platoon, Complete, w/o explosives		box open	
194	Set, Demolition, No. 2, Engr. Platoon, Complete, w/o explosives		box closed	
195	Bomb, Photoflash, 50 lb. T6E2	1	bare	D

SECRET

<u>Item No.</u>	<u>Nomenclature</u>	<u>Samp Tag No.</u>	<u>Color</u>	<u>Size</u>	<u>Compound</u>
201A	Neoprene (GR-M) No. 1109N 208	1	orange	2'x1 1/2'	
201B	Neoprene (GR-M-10) No. 1109N-209	1	black	2'x1 1/2' x 1/4"	Gum Stock Loaded Stock
202	GR-S Rubber Piece A	2	gray-brown	1'x 1 1/2'	No
	Piece B	2	gray-brown	or	No
	Piece C	2	gray-brown	1'x 2'	No
	Piece D	2	gray-brown		No
203	Buna-N (Butaprene NXM)	3	black	2'x3' x 1/2"	
204	Natural Crude Rubber	4	black	2'x3' x 1/2"	No
205	Black Butyl	6	olive drab	2'x3' x 3/8"	Yes
206	White Butyl	7	white	2'x3' x 3/8"	Yes
207	Gum Butyl	9	black	2'x3' x 3/8"	Yes
208	Black Perbunan	5	black	2'x3' x 3/8"	Yes
209	White Perbunan	8	white	2'x3' x 3/8"	Yes
210	Gum Perbunan	10	tan	2'x3' x 3/8"	Yes

* All samples were displayed bare and flat.

3. Materiel displayed for Test Baker

<u>Item</u>	<u>Displayed</u>	<u>Nomenclature</u>	<u>Where Displayed</u>
22	2	Gun, 40mm, AA, M1, w/Mount	LOT 812 and LST 125
		Gun, 40mm, AA, M2A1	
23	2	Gun, 90mm, AA, M2, w/Mount	
		Gun, 90mm, AA, M2	LOT 1113 and USS Saratoga
24	3	Gun, 155mm, M2, w/carriage	Bikini Island, USS Penn-
		Gun, 155mm, M1A1	sylvania, and USS Saratoga
25	2	Howitzer, 105mm, M2A1	
		w/carriage, Howitzer, 105mm, M2A2	LOT 412 and LST 545
26	2	Launcher, Rocket 4.5", T66E2	LOT 1113 and LST 125

SECRET

<u>Item</u>	<u>No. Displayed</u>	<u>Nomenclature</u>	<u>Where Displayed</u>
27	2	Mortar, 81mm, Complete	LCT 812 and LCT 412
45	1	System, Cable M1	USS Saratoga
52	1	Unit, Generating M7A1	
		w/Trailer, Generator, M7	LCT 412
55	3	Car, Armored, Light M3	Bikini Island, LCT 1187 and LST 125
56	3	Carriage, Motor, Gun, Multiple M16	LCT 812, LCT 1113, and LST 125
58	2	Carrier, Cargo, M290	Bikini Island and LCT 1187
57	4	Carriage, Gun, Motor, 90mm, M36	USS Arkansas, USS Nevada, USS Pennsylvania and USS Saratoga
59	4	Tank, Heavy, M26	" "
60	3	Tank, Light, M24	USS Nevada, USS Penn- sylvania and USS Saratoga
61	2	Truck, 1/4 Ton 4x4	Bikini Island and LST 545
62	2	Truck, 2 1/2 Ton, 6x6	Bikini Island and Bikini Lagoon, 300 yds. offshore
63	1	Truck, Automotive Repair 2 1/2 Ton, 6x6, M8A1	Bikini Island

**B. DISPOSITION, METHOD OF SECURING AND STATE OF PREPARATION OF
TEST ITEMS FOR TEST ABLE.**

1. General

a. One complete set of materiel, listed in paragraph A.1. was displayed on the weather decks of the following ships: USS Arkansas, USS Nevada, USS Pennsylvania, and the USS Saratoga, moored at approximately 600 yards, 600 yards, 1600 yards, and 2300 yards, respectively from the Able Atomic Bomb burst. The materiel was distributed about the decks of the ships in locations assigned by the U.S. Navy Bureau of Ships, based on structural strength for the heaviest items and on available area for the lighter items. All materiel was fastened to the deck by various methods of fastening and anchorage. An attempt was made to attach the lashings to the same place on each type of materiel on each of the four ships. Some typical lashings are illustrated by photographs in the following paragraphs.

2. Artillery

a. All Artillery materiel was prepared by placing each type in firing position and operating condition, with the exception that a light coat of preservative was left in the bore of all cannon for weather protection during the interval personnel were evacuated from the

SECRET

target ships. All pieces were at battery front at 15° elevation. The 40mm and 90mm AA guns were trained 90° to the center line of the ship, at 15° elevation. Prior to the Able Test all operating parts were cleaned and lubricated. Preservative applied to the materiel for overseas shipment, was not removed where it did not interfere with operating the materiel in the accepted practical use of the weapon.

(1) Fig. 5 shows the method of securing the Gun, 40mm, AA, M1, w/mount, Gun, 40mm, AA, M2A1, (Item 22), to the deck. Three perpendicular plates were welded between the outrigger jack stews and floats, which in turn were welded to plates for more area, which were secured to the deck by four through bolts.

(2) Fig. 6 is a general view of the Gun, 90mm AA, M2 w/mount, Gun, 90mm, AA, M2 w/recoil mechanism M17 and Fuse-Setter Hammer, M20, (Item 23), materiel secured to the deck. Two through U-bolts over each outrigger and through bolts around the periphery of the bottom carriage plate, held the materiel to the deck. The spades were burned off the bottom carriage. In addition, angles bearing against the edge of the bottom carriage plate at 45 degrees to the outriggers, were secured to the deck by through bolts to prevent shifting. Front and rear bogies were not included in the test.

(3) Fig. 7 and Fig. 8 are views of securing the Gun, 155mm, M2, w/carriage, Gun, 155mm, M1A1 and Recoil Mechanism, M3, (Item 24), to the deck of the USS Arkansas and the USS Pennsylvania respectively. The latter photograph shows the strongback over the bottom carriage horn secured by bolts through the deck, a wooden saddle cut to the contour of the horn was placed under the strongback. The former photograph shows the wheel blocking and also the angle iron which prevented side shifting of the carriage. Over the trail can be seen the through U-bolts which hold the trails to the deck. Only one limber, M5, was displayed, and that on the USS Pennsylvania.

(4) Fig. 9 and Fig. 10 are typical photographs of the Howitzer, 105mm, M2A1, w/carriage, Howitzer, 105mm, M2A2, and Recoil Mechanism, M2A1, (Item 25), secured to the deck. Blocking

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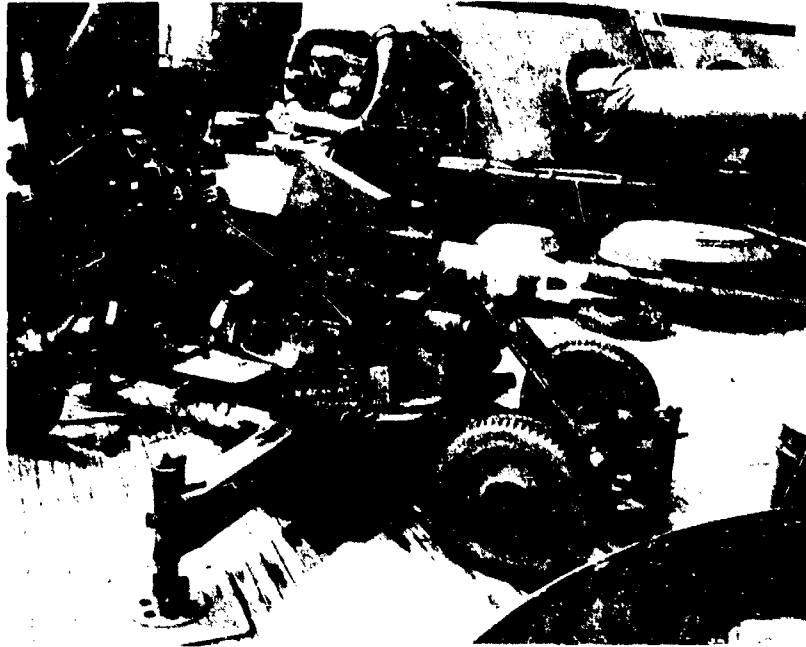
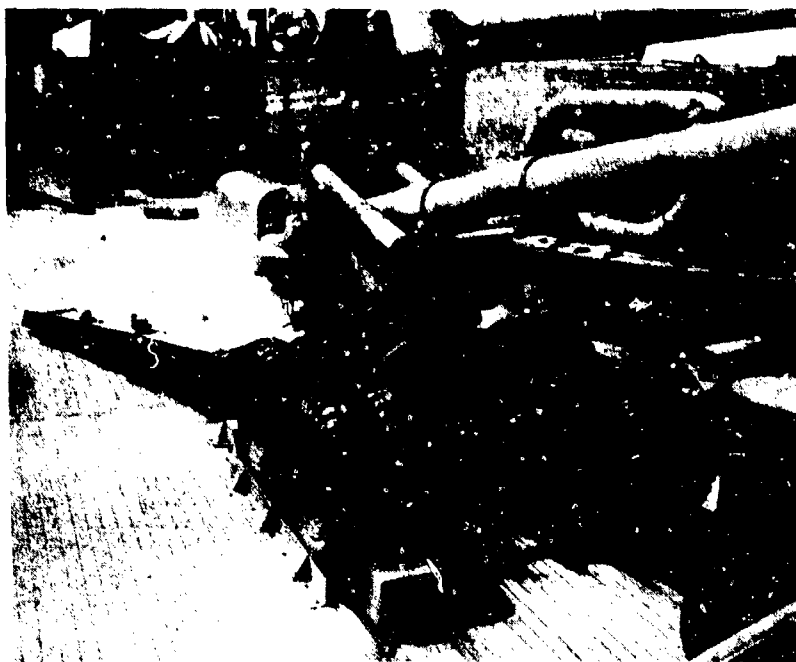


Fig. 5 - USS Arkansas - Carriage, 40mm, AA, M2A1 -
Showing method of securing to deck.



Fig. 6 - USS Nevada - Carriage, 30mm, AA, M2 -
Showing method of securing to deck.

SECRET



**Fig. 7 - USS Arkansas - Carriage Gun, 155mm, M1A1 -
Right front view.**



**Fig. 8 - USS Pennsylvania - Carriage Gun, 155mm, M1A1 -
Detail of clamp over bottom carriage horn
to secure carriage to deck.**

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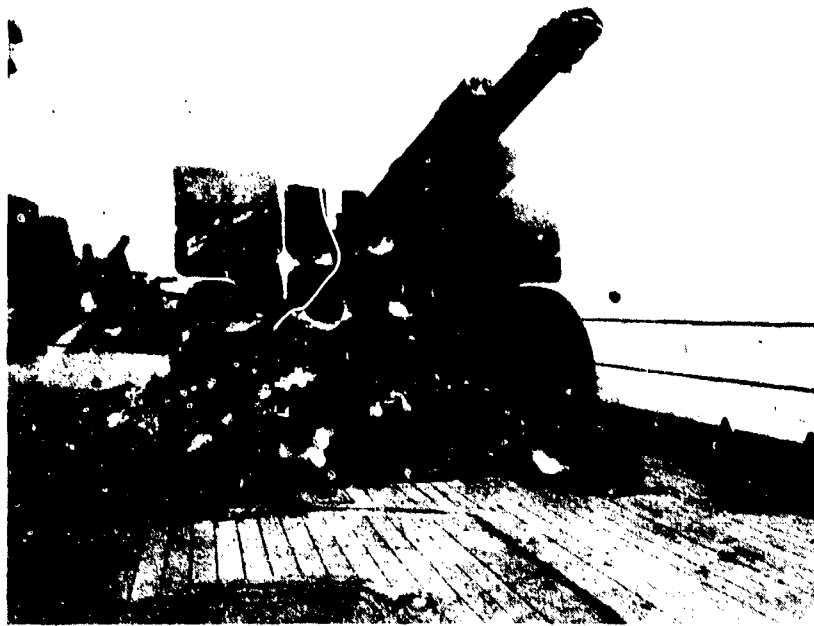


Fig. 9 - USS Arkansas - Howitzer, 105mm M2A1 -
Right front view showing deck fastenings.

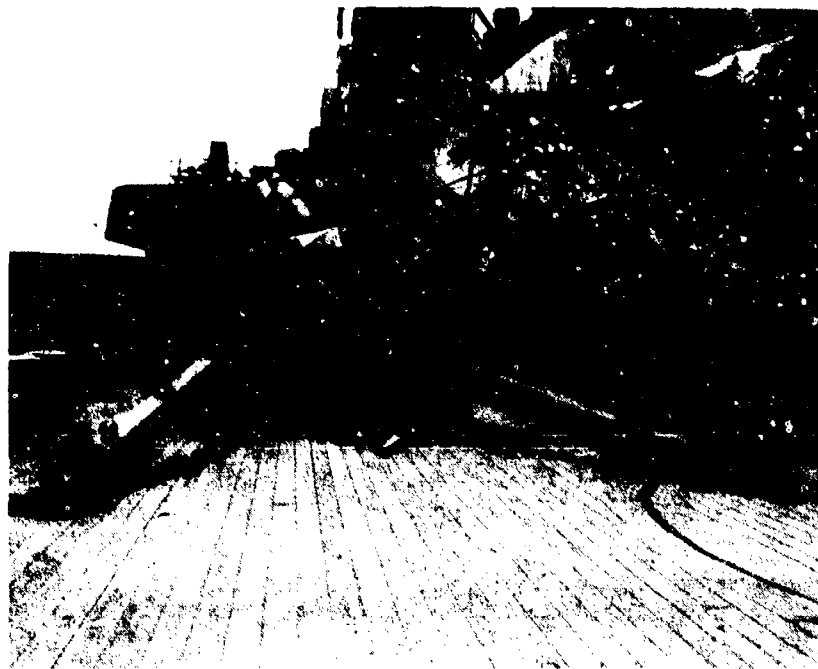


Fig. 10 - USS Arkansas - Howitzer, 105mm, M2A1 -
Rear view showing deck fastening.

SECRET

and angle iron were used as in the 155 mm materiel. The spade blade was removed and the end of the trails secured by drilling the float surfaces for through bolts. The towing hooks were utilized for turnbuckles, connected to through eyebolts, to secure the carriage in the front.

(5) Fig. 11 and Fig. 12 show the Launcher, Rock-4, 4.5", T66E2, Complete, (Item 26). In the latter it will be noticed that the vertical spade had been burned off the trails and the float area welded to a plate of larger area which is in turn bolted to the deck. The former photograph shows the bolts through the firing pedestal. All bolts were through the deck.

(6) Fig. 13 is the method used on the USS Nevada for displaying the Mortar, 81 mm, M1, w/mount, 81 mm, M4, (Item 27). The other ships secured the materiel on pallets by metal strapping.

3. Tank and Automotive

a. All armored vehicles were secured to the deck by rods or turnbuckles from the towings links on the tanks to pad eyes on the deck, see Fig. 14, 15, 16, 17 and 18. All general purpose automotive vehicles were lashed to the deck by a 1/4 inch cable over the frame to eye bolts through the deck on either end, see Fig. 19, and 20. All amphibious vehicles were lashed to the deck by rods or 5/8" cable through the towing links or pintle. To give additional stability to the DUKW a 5/8" cable was run through the lifting eyes and fastened to eye bolts in the deck, see Fig. 21 and 22. For shipment, all automotive vehicles were shored up from the deck to the frame to relieve the springing action of tires and springs. This shoring was removed before the test to allow the vehicles to absorb as much of the shock as possible through the springing action of the tires and springs, see Fig. 23 and 24. In several instances the vehicle was given additional stability by lashings through the lifting eyes to eye bolts or pad eyes on the deck, see Fig. 21. In addition to lashing used to secure all items to the deck, angle irons were placed along side the tires or tracks to prevent side slipping and wooden chocks beneath front and rear wheels to prevent front to rear movement, see Figs 15, 23, and 25. All automotive equipment was displayed in actual tactical operating condition for Test Able. The materiel was prepared in the following way:

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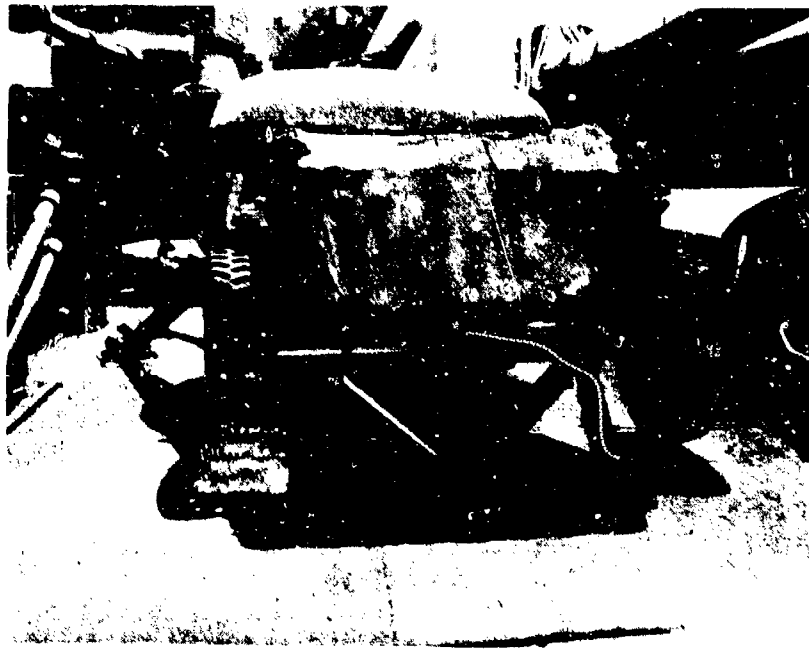


Fig. 11 - USS Nevada - Launcher, Rocket, 4.5", T66E2 -
Front view showing method of securing to deck.



Fig. 12 - USS Pennsylvania - Launcher, Rocket, 4.5", T66E2 -
Showing method of securing to deck.

29
SECRET

SECRET



Fig. 13 - USS Nevada - Mortar, 81mm, M1 -
Method of securing to deck
prior to test.

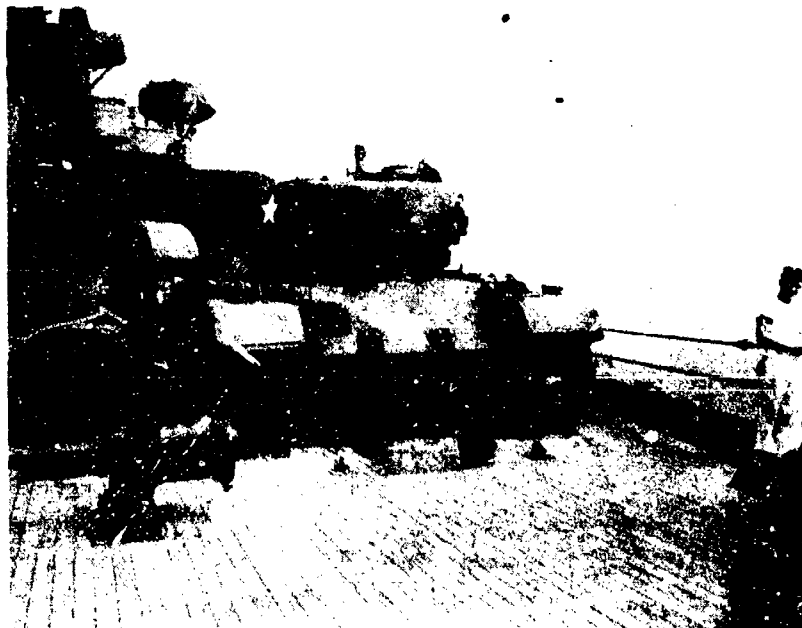


Fig. 14 - USS Arkansas - Tank, Heavy, M26 -
Showing front lashings and chocks.

SECRET



Fig. 15 - USS Arkansas - Tank, Heavy, M26 -
Showing rear lashings, chocks, and
side braces.



Fig. 16 - USS Nevada - Carriage, Motor, 90mm Gun, M36-
Showing rear lashings to deck.

SECRET



Fig. 17 - USS Pennsylvania - Tank, Light, M24 -
Showing method of securing to deck.



Fig. 18 - USS Saratoga - Car, Armored, Light,
M8 - 3/4 rear view showing method of
lashing to deck.

32
SECRET

SECRET

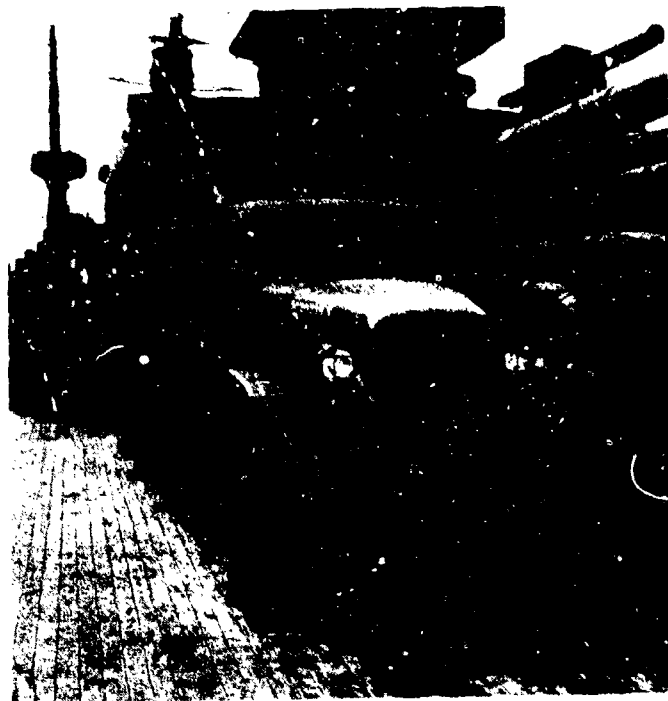


Fig. 19 - USS Arkansas - Truck, Auto. Repair,
2 1/2 T n, 6x6, M8A1, Load A -
Showing front lashing, chocks, and shoring.

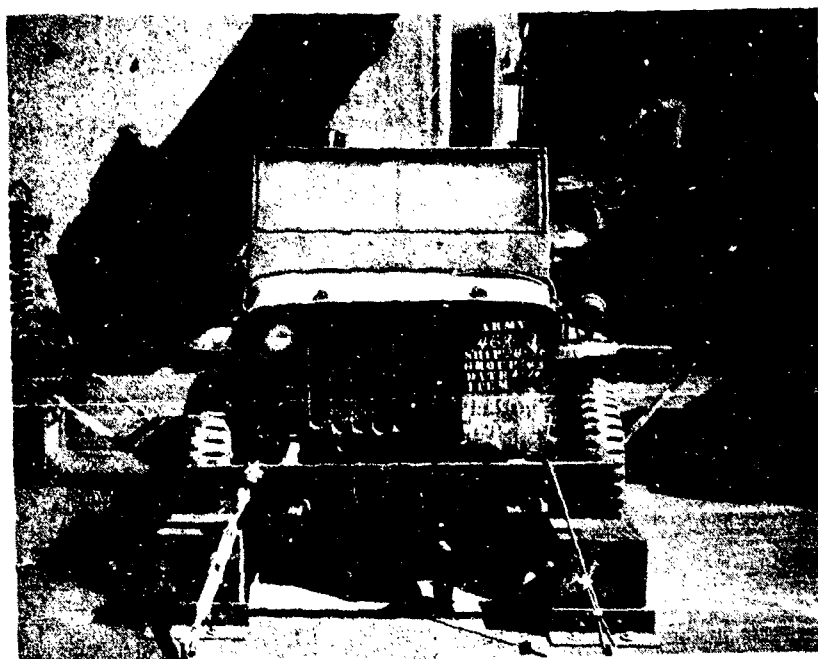


Fig. 20 - USS Nevada - Truck, 1/4 Ton, 4x4 -
Showing front lashings to deck.

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Fig. 21 - USS Saratoga - Truck, 2 1/2 Ton, Amphibian, 6x6, 3/4 rear view showing method of lashing to deck.

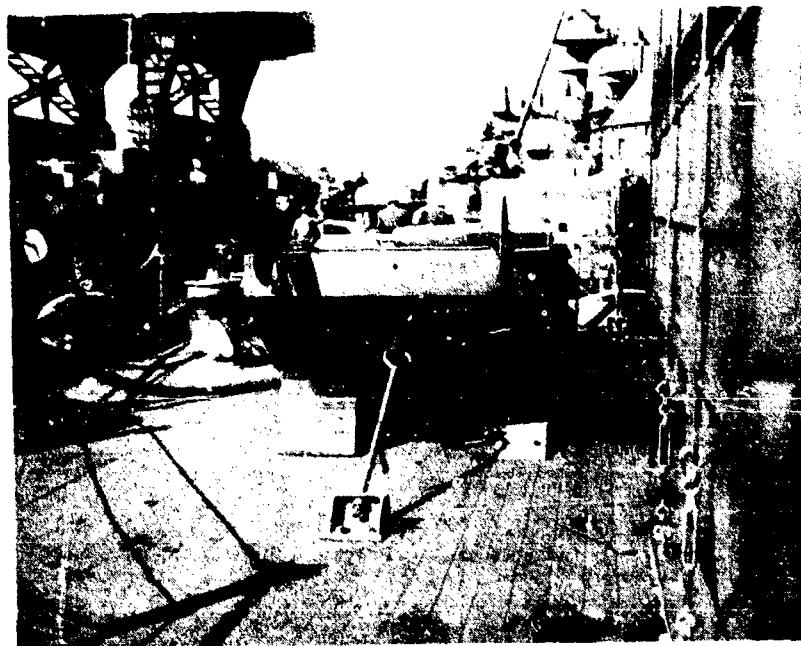


Fig. 22 - USS Pennsylvania - Carrier, Cargo, M290 - Showing method of securing to deck.

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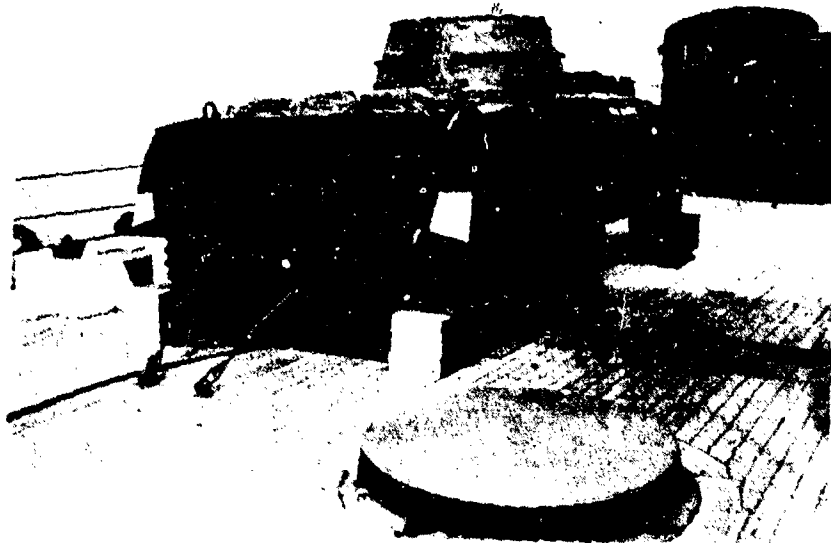


Fig. 23 - USS Arkansas - Car, Armored, Light, M8 -
Showing method of securing to deck.



Fig. 24 - USS Arkansas - Truck, Auto. Repair, 2 1/2 Ton,
6x6, M8A1, Load A- Showing rear lashing to
deck, rear chocks, and shoring.

SECRET



Fig. 25 - USS Arkansas - Carrier, Cargo, M29C -
Showing rear lashings, chocks, and side
bracing.



Fig. 30 - USS Arkansas - Fire Control Pallet -
Method of securing items using steel wires.

SECRET

- (1) All tank hatches were closed and locked. Periscopes were open.
- (2) All artillery pieces were in battery front position.
- (3) Brakes were set on all automotive equipment.
- (4) An attempt was made to run engines on all vehicles both before and after the test. If the engine failed to function, after the test, no repair work was done.
- (5) No gasoline was left in vehicle tanks for the test. All engines were run until the gasoline supply was exhausted. Compressed air was then used to dissipate any fumes in the fuel tanks. Fuel caps were left on fuel tanks.
- (6) Windows on the 2 1/2 T, 6x6 Truck, Automotive, Repair, MBAL, were opened throughout with the exception of the windshield.
- (7) All canvas covers were removed and stowed below except Cover, Mantlet, 90mm, on the Tank, Heavy, M26 (Item 59). This cover remained in place.
- (8) All on carriage equipment was displayed in proper positions, including pioneer equipment.
- (9) The Truck, 1/4 T, 4x4 (Item 61), windshield was folded flat over the hood.
- (10) The Truck, 2 1/2 T, 6x6, Amphibian (Item 62), windshield was folded flat over the hood.

The only deviation from the above occurred under sub-paragraph (5). The ships that had no compressed air filled their empty fuel tanks with COB.

4. Fire Control

- a. All small fire control primary items were displayed secured to pallets by steel wire on the

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USS Arkansas and steel strapping on all other ships. Figs 30 and 31 illustrate both types of lashing. The items were displayed with no special preservative preparations. The following is a list of items so displayed:

Binoculars, M15A1 (Item 28)
Circle, Aiming, M1 (Item 29)
Clock, Message Center, M1 (Item 30)
Finder, Range, M7, (Item 34)
Telescope, T108E2 (Item 47)
Telescope, BC, M65 (Item 48)
Watch, Pocket (Item 53)
Watch, Wrist (Item 54)

b. The generator and director trailers were secured to the deck by lashings at the front and rear. Towing eyes or lifting loops were used where present and pads or loops were welded to the bodies where other means were not already provided, as shown in Figs. 32, 33, 34, 35 and 36. Chocks were used to prevent forward and backward movement and angle iron was secured beside the tires to prevent skidding. The leveling jacks were lowered in all cases, supporting the weight of the vehicle. All generators were installed in a splash pan that extended beyond the outer edges of the trailer. On all ships except the USS Saratoga, the side walls of the splash pan were 15 inches high. The USS Saratoga pan was eight inches high.

c. The Unit, Generating, M7A1, (Item 52), was displayed for test in operating condition without fuel. The radiator doors were open and the side panels latched down. An exception to this was the USS Saratoga, where the panels were hooked open.

d. The Director, M9A2, (Item 52), was not energized but was otherwise set up for operation. The rear trailer doors were latched open on the M14 trailer and the instrument panel covers removed on the computer and altitude converter.

e. The Trailer, M13, without canvas top, was used for the director on the USS Nevada. The Director in this instance was the M9A1 rather than the M9A2 as on the other ships.

f. The Tracker, M2, was mounted on its tripod near the director trailer. The tripod was secured on all ships, except the USS Arkansas, by bolting the pads on the adjustable legs to the deck. On the USS Arkansas,

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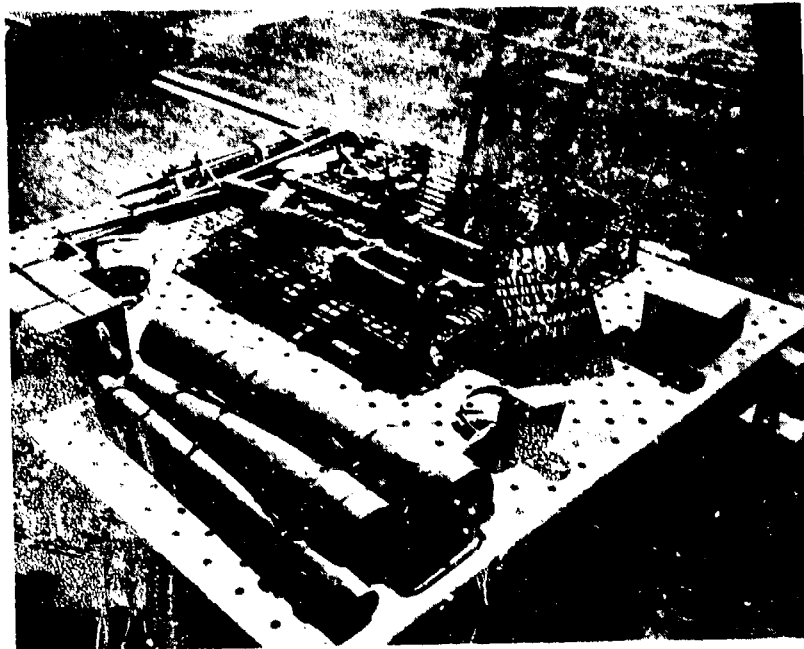


Fig. 31 - USS Saratoga - Fire Control Pallet - Method of securing items using steel strapping.

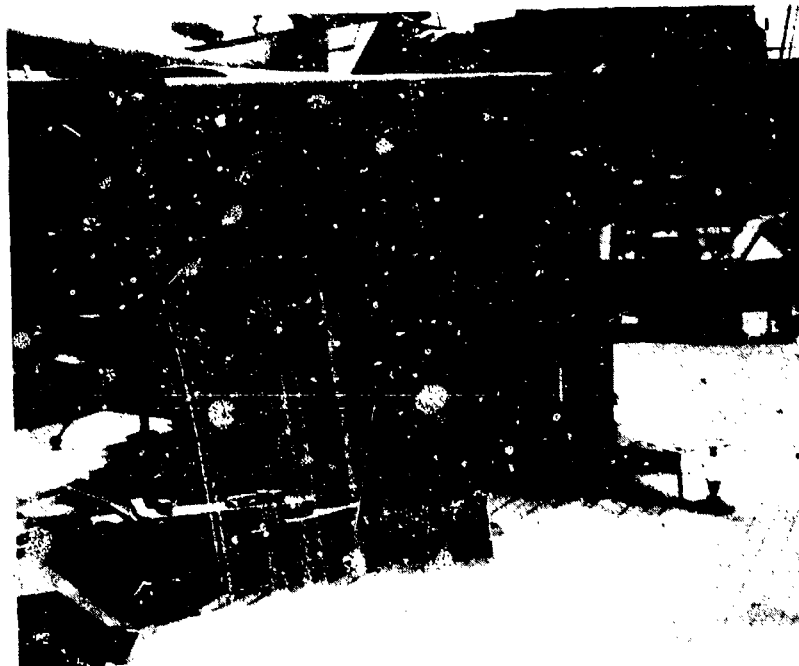


Fig. 32 - USS Arkansas - Director, M9A2 and Trailer, W14 - Method of securing to deck.

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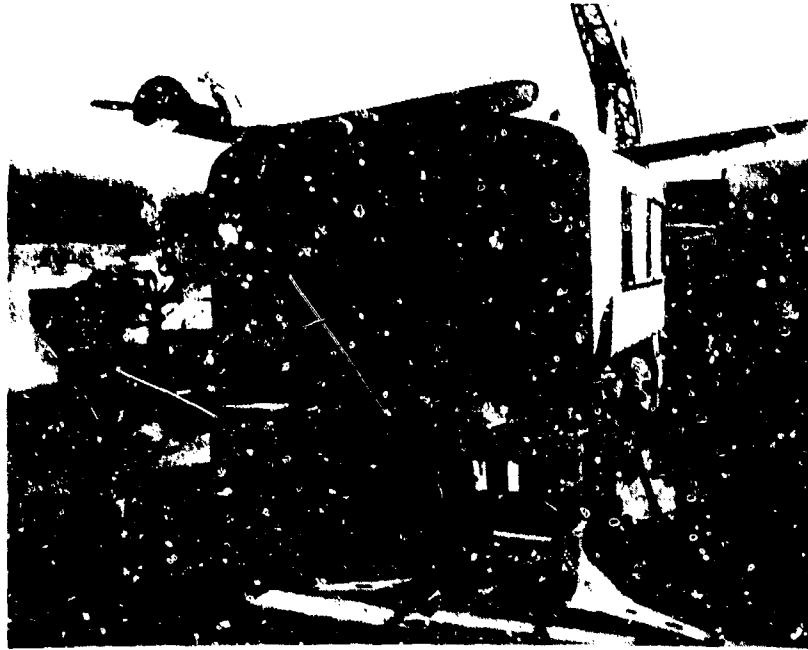


Fig. 33 - USS Pennsylvania - Director, M9A2 and
Trailer M14 - Method of securing to deck.



Fig. 34 - USS Pennsylvania - Unit, Generating, M7A1 -
Method of securing to deck.

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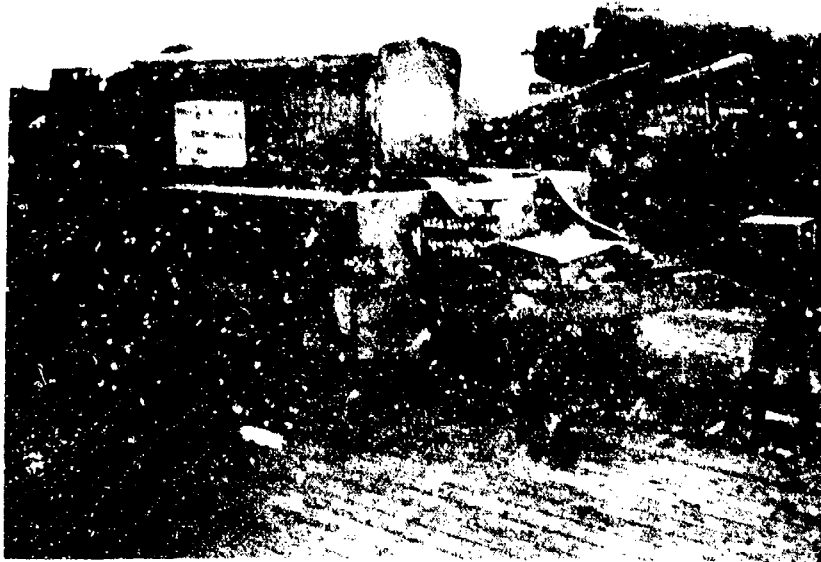


Fig. 35 - USS Saratoga - Unit, Generating, W7A1 -
Method of securing to deck.

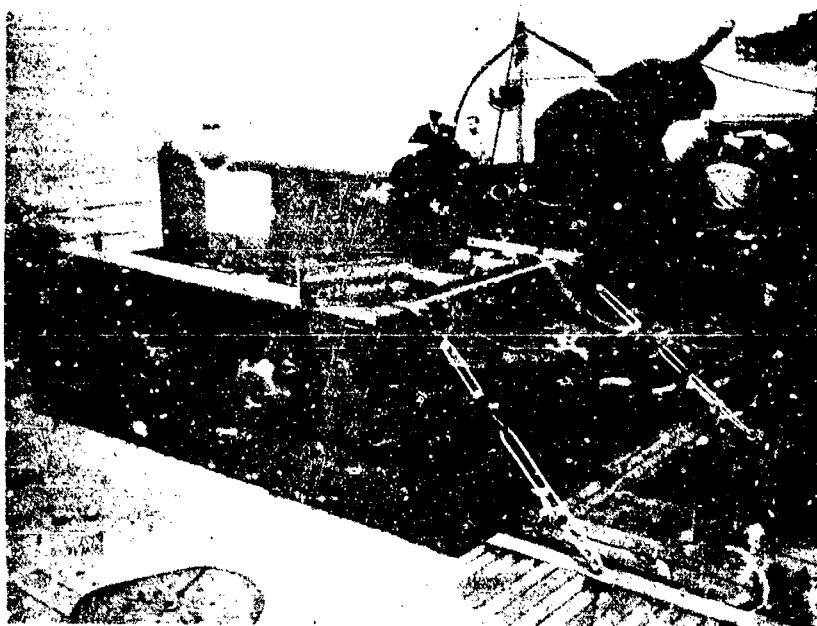


Fig. 36 - USS Arkansas - Unit, Generating, W7A1 -
Method of securing to deck.

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bolts were run through the detachable portion of the leg, and through the deck, as shown in Fig. 32.

d. The Director, M7A1B1, (Item 31), was displayed without its tripod, resting on the traveling base. Two methods of securing were used. On all ships except USS Pennsylvania special fixtures were constructed to hold the director down by means of the porter bar holes as shown in Fig. 37. On the USS Pennsylvania the traveling base was bolted to channel iron as shown in Fig. 38.

e. The Height Finder, M1A1, (Item 33), was set up on its tripod and held in place by brackets constructed for that purpose, as shown in Fig. 39.

f. The Cable System, M1 (Item 45), was displayed on the deck connecting the generator, height finder, director, and 90mm AA Gun, in the normal manner as shown in Fig. 40.

5. Small Arms and Aircraft Armament.

a. Items 1, 2, and 7 through 18 inclusive were displayed for the test on wire mesh pallets. The pallets on the USS Saratoga were welded to steel tables raised approximately 24" above the deck. Pallets on the other three ships were secured by welding or bolting directly through the deck of the ship. The weapons were fastened to the pallets by means of 3/16" or 1/2" steel strapping. Wooden wedges and forms were used where necessary to insure tightness. All weapons were placed on the pallets in such a way as to leave them free for dry-firing and functioning.

b. Dummy ammunition was supplied for the Automatic Pistol cal. 45, M1911A1, the Submachine Gun, Cal. 45, M3A1, and the Browning Automatic Rifle, cal. 30, M1918A2, and the U.S. Rifle, cal. 30, M1C. These, as well as the weapons without dummy ammunition, were cocked and in a ready-to-fire condition during the test. A light coat of preservative oil was applied to all surfaces. The water jackets of the Machine Guns, cal. 30, M1917A1, were filled. Each Rocket Launcher, 2.36", M9E2 was assembled and its sight extended to the aiming position. All of the Trench Knives, M4 were displayed separately from the Scabbards, M3A1. The Cheek Pad, Telescopic Sight, and M1 Flash Hinder were affixed to each U.S. Rifle, cal. 30, M1C. Both the Elbow Telescope, M62 and the Telescope, M85C were attached to the Recoilless Rifle,

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Fig. 38 - USS Pennsylvania - Director,
W7A1B1 - Method of securing by
means of the traveling base.

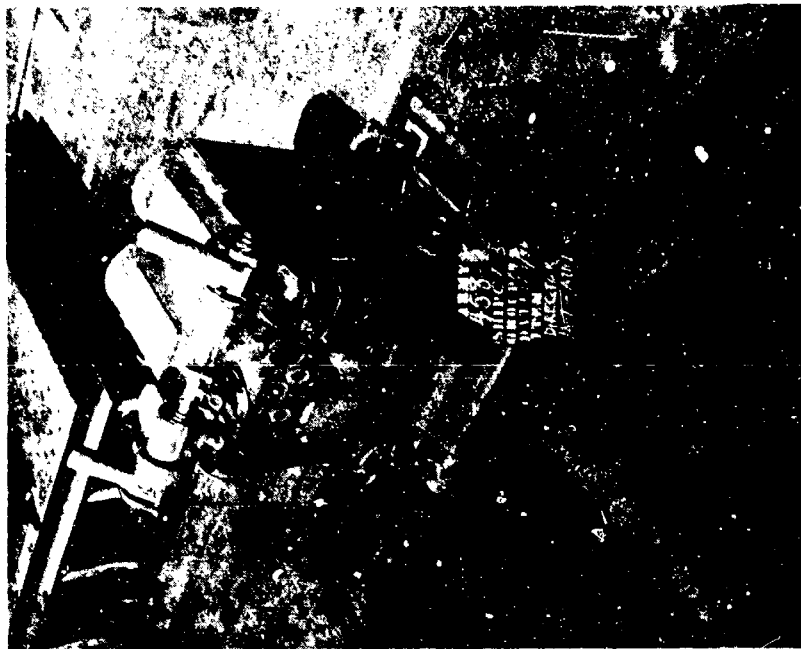


Fig. 37 - USS Saratoga - Director, W7A1B1 -
Method of securing using fixtures
through the porter bar holes.

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Fig. 39 - USS Saratoga -- Height Finder, W1A1 -
Method of securing.



Fig. 40 - USS Nevada -- Cable System, W1 in use.

44
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75mm, M20, and the proper lighting equipment was installed. The Feed Mechanism, 20mm, AN-M2, was placed on the Automatic Gun, 20mm, M3.

c. All weapons were checked before the test for functioning and were found to be in working order. A squib was successfully ignited to test the firing circuit of the Rocket Launcher, 2.36", M9E2.

d. Fig. 41, 42, 43 and 44 show typical pallet displays and method of securing the weapons on each ship.

e. The Cannon, Aircraft, 75mm, M10, was displayed separately from the pallets and may be located on each ship by reference to Appendix E. The breech blocks were closed and the feed mechanisms were set at the start of a feeding cycle. All recoil cylinders and replenishers were properly filled except for the weapon on the USS Nevada which had faulty recoil cylinder gaskets and would not retain the recoil oil. No replacement gaskets were available so this piece was not repaired. The guns were operated through a feeding cycle manually, except in the case of the USS Pennsylvania, as noted in subparagraph VI D 17c. Each was coated with preservative oil and light grease was left in the bore and around the breech. This gun and the method of securing may be seen in Fig. 45 and 46. It will be noted that the unit is secured to the deck at three points.

f. The Parachest Display, Items 20 and 21 (ref. para. A.1), were located near to but separate from the pallets. These were secured on the USS Nevada by a wire cable and an eye welded to a 40mm gun tub. The location may be seen in Fig. 47. The other three ships secured theirs to the deck means of the same type of steel strapping as used on the pallet items. Fig. 48 shows the parachest display on the USS Pennsylvania and Fig. 41 shows the location on the USS Arkansas. The wheel and axle assembly of each paracaisson was assembled to the body of the caisson.

6. Ammunition and Explosives

a. The ammunition and samples of rubber displayed on the weather decks of the YOG 83, LST 52, LST 661, LST 220 and LST 545 moored at 1000, 1500, 2300, 3300 and 4100 yards respectively from the Able bomb burst, were segregated into four groups according to its particular characteristics, such as: A- Inflammables, B - Incendiaries, C - Blast, D - Missiles. The rubber samples were displayed with the ammunition in the A group because of their potential.

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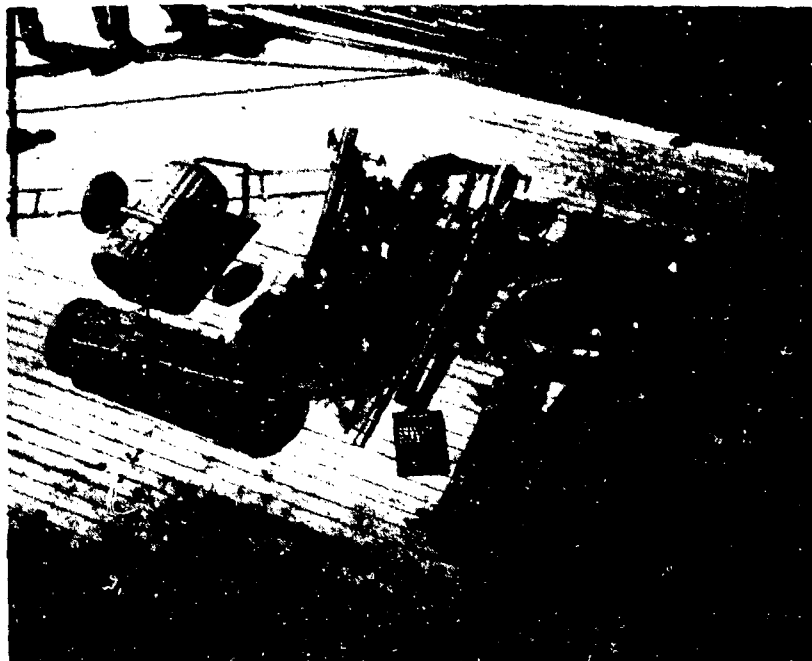


Fig. 41 - USS Arkansas - Pallet displays and Parachest and Paracaisson.

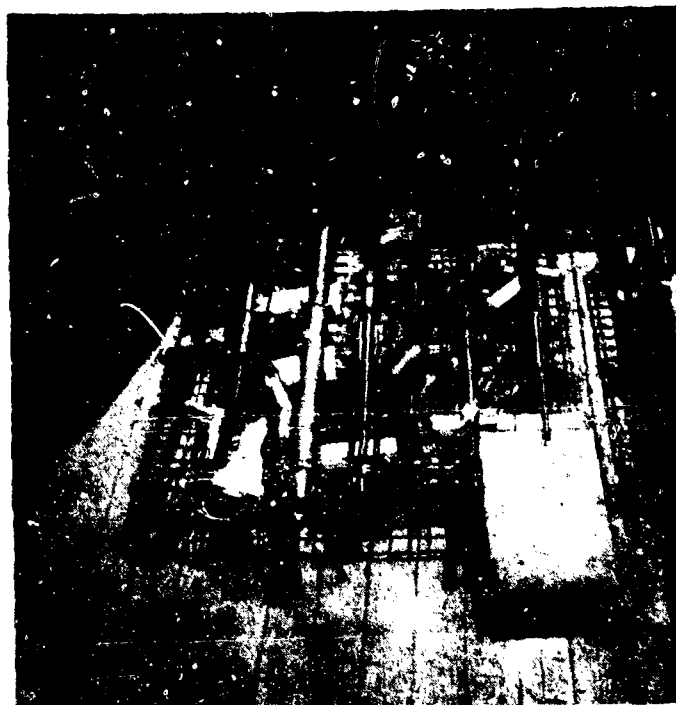


Fig. 42 - USS Nevada - Small Arms Pallet.

46
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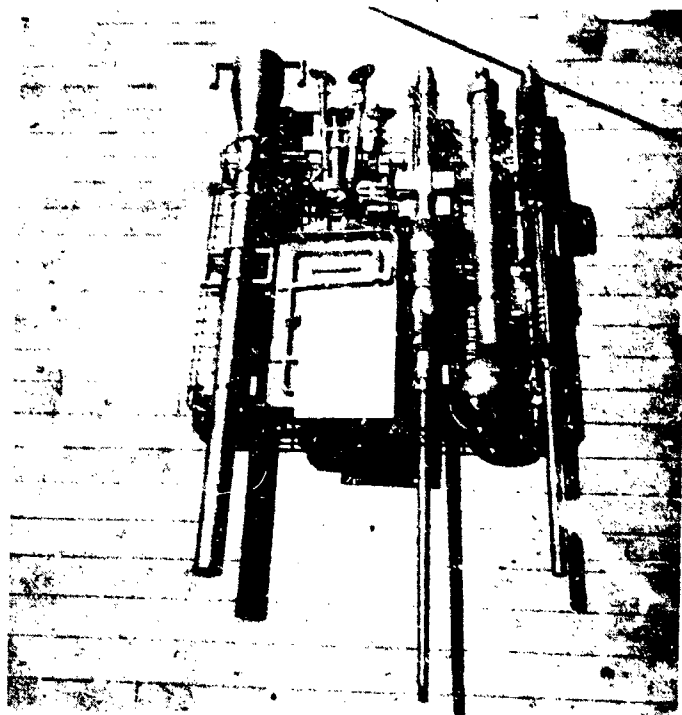


Fig. 43 - USS Pennsylvania - Small Arms Pallet.

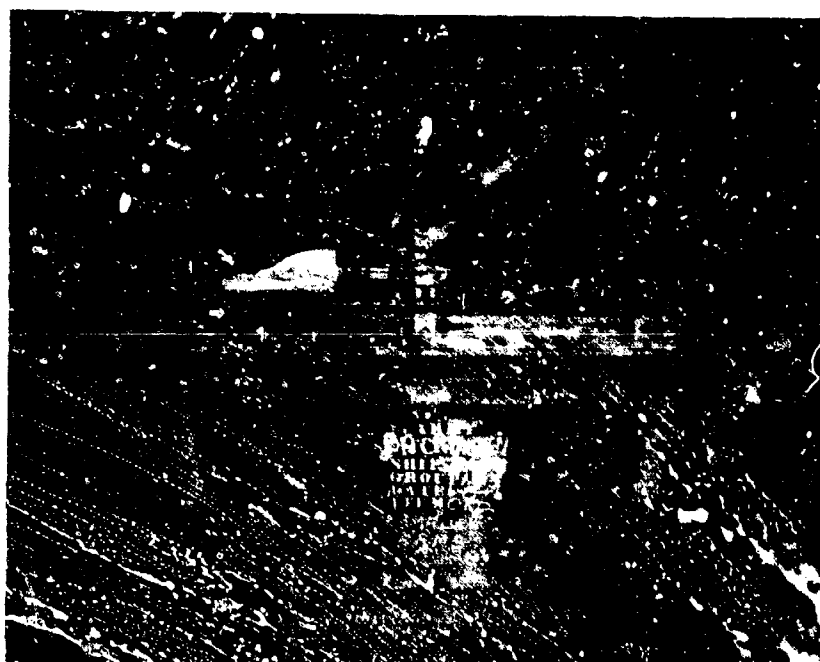


Fig. 44 - USS Saratoga - Small Arms Pallet.

47
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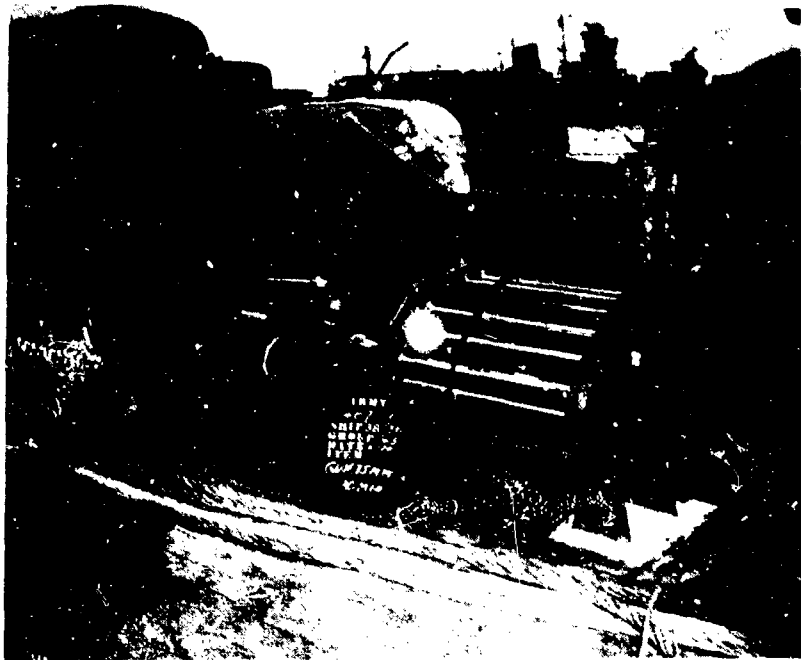


Fig. 45 - USS Nevada - Gun, 75mm, AC, M10.

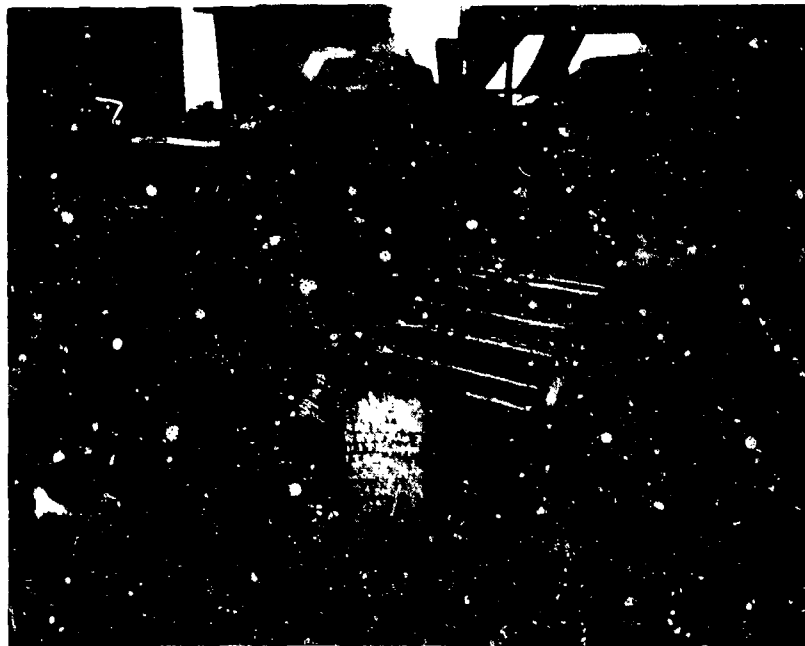


Fig. 46 - USS Pennsylvania - Gun, 75mm, AC, M10

48
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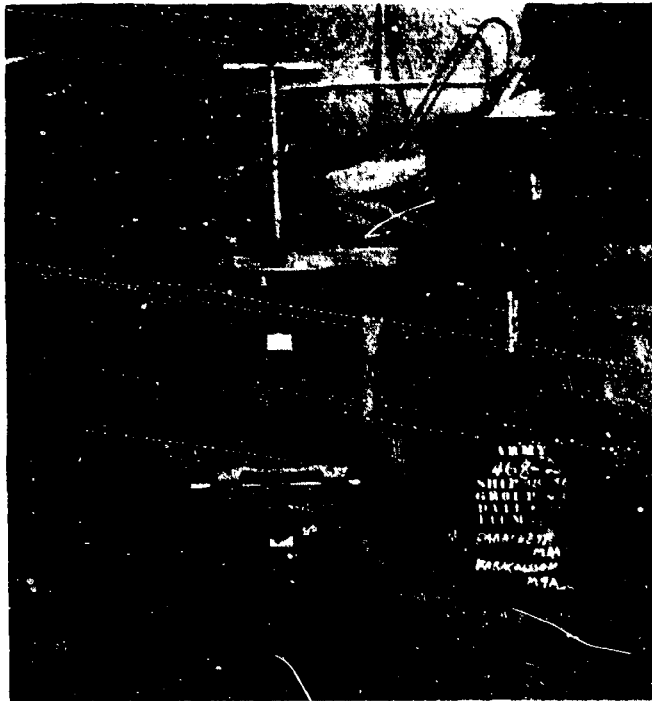


Fig. 47 - USS Nevada - Parachest M8A1 and Paracaisson M9A2.

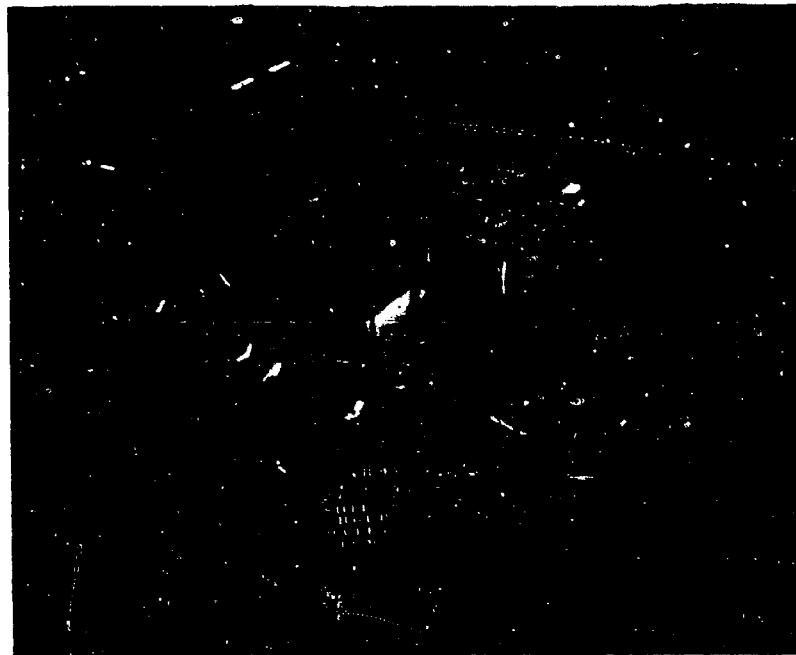


Fig. 48 - USS Pennsylvania - Parachest M8A1 and Paracaisson M9A2.

49
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inflammability. The ships were not arranged alike in the order of display by groups but were arranged to conform to the interferences on the deck as shown in Fig. 4, Fig. 50, and Fig. 51. The individual ammunition items and the rubber samples were displayed on steel storage pallets 48" x 48", shown in Fig. 52. Between the test item and pallet were placed squares of 1/4" sheet asbestos, Fig. 53, to prevent the heat from the deck being transmitted to the ammunition item displayed. Small items such as Fuzes and Small Arms Ammunition, Fig. 54, were first secured to 12" x 12" sheet steel plates by 16 ga. iron wire. Larger items of ammunition and the above mentioned steel plates were then rigidly secured to the asbestos covered pallets by means of steel strapping Fig. 55. Items such as the 4000 lb. bomb were secured by means of 3/8" wire rope, Fig. 56. Some small items such as the Demolition Blocks were secured to the pallet by means of 16 ga. iron wire. In all cases, the items displayed were rigidly secured to the pallets to prevent shifting and subsequent damage. The explosive content of the Bomb, Demolition, 4000 lb. AN-M56A1 (Item 140) was reduced from 3350 lbs to 300 lbs. to minimize the blast damage should the high explosive filler be detonated. The explosive filler was uniformly cast around the walls of the bomb to determine if the heat generated by the detonation of an atomic bomb would penetrate the metal walls of the bomb sufficiently to detonate the explosive filler. The interior void was filled with an inert filler.

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Fig. 50 - USS LST 220 - Showing a typical ammunition group layout (C group facing port).



Fig. 51 - USS LST 220 - Showing a typical ammunition group layout. (C group facing starboard).

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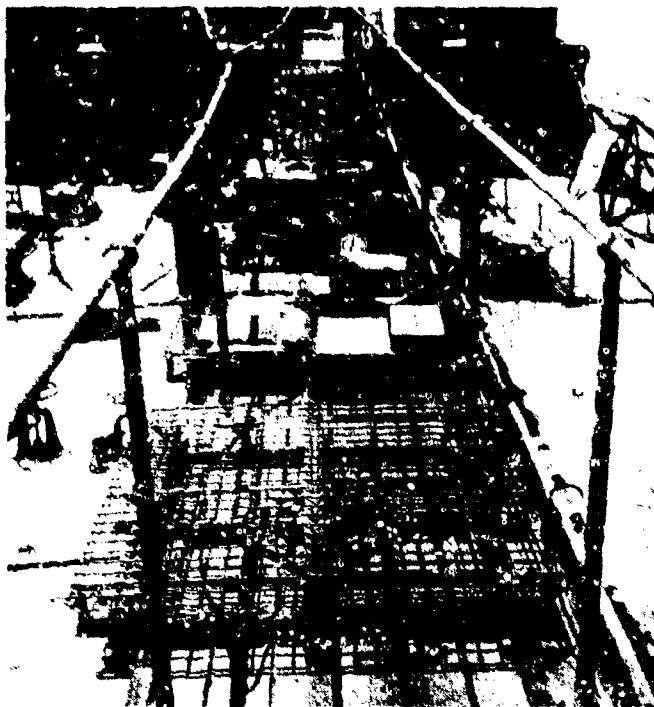


Fig. 52 - USS YOG 83 - Showing pallets used in securing ammunition.

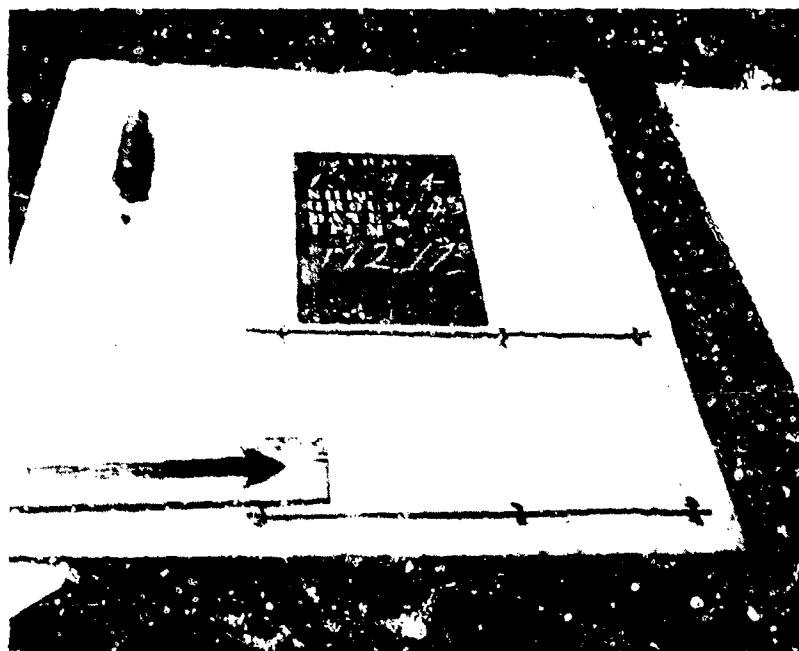


Fig. 53 - USS LST 661 - Showing the asbestos used between certain ammunition items and the pallet.

52
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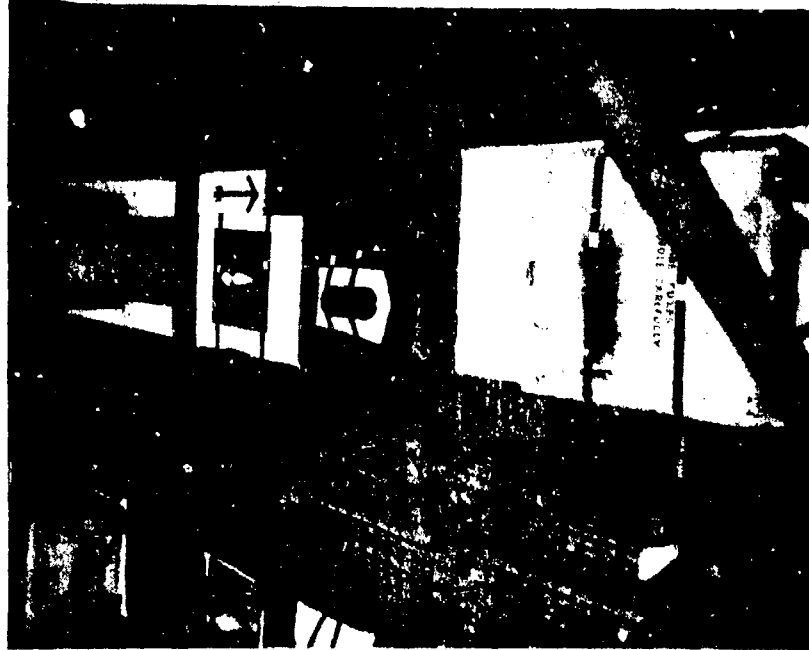


Fig. 55 - USS YOG 83 - Showing method of securing items to the asbestos covered pallets.



Fig. 54 - USS YOG 83 - Showing a steel plate used in securing small items of ammunition.

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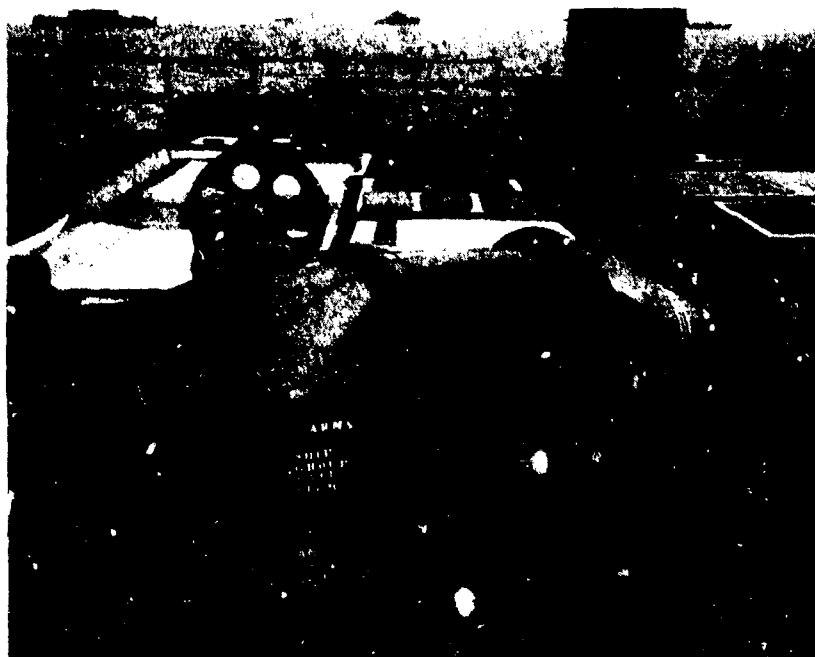


Fig. 56 - USS LST 52 - Method of securing the
4000 lb. bomb.

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C. DISPOSITION, METHOD OF SECURING AND STATE OF PREPARATION OF TEST ITEMS FOR TEST BAKER.

1. Representative items of each type of Ordnance materiel listed in Para. A3., was displayed for Test Baker on Bikini Island, on LCT 412, LCT 812, LCT 1187, and LCT 113, on the weather decks of LST 545, USS Arkansas, USS Nevada, USS Pennsylvania, and USS Saratoga, and on the tank deck of LST 125. The distance of each vessel from the target and from the Bikini Beach was as follows:

<u>Ship</u>	<u>Distance in yards from Bikini Beach</u>	<u>Approximate Distance in yards from Target</u>
LCT - 412	Beached	6000
LCT - 812	"	6000
LCT - 1187	"	6000
LCT - 1113	2000	4000
LST - 125	Beached	6000
LST - 545	2300	4100
USS Arkansas	----	
USS Nevada	----	1100
USS Pennsylvania	----	1500
USS Saratoga	----	

The Bikini beach line struck a radius of 6000 yards with the target center. The LCT 412, LCT 812, and LCT 1187, spaced at unequal intervals along the beach for a distance of 1800 yards, were nosed into the beach with ramps closed as shown in Fig. 57. The remainder of the vessels were moored in berths assigned for Test Baker by the U.S. Navy Bureau of Ships. The overall layout of the target in the immediate vicinity of Bikini is shown in Appendix I.

2. The six items of equipment displayed on Bikini Island were placed on slightly raised ground 75 yards inland and were dispersed over 700 yards along the shore in a manner illustrated by Fig. 58, Fig. 59, Fig. 60, Fig. 61 and Fig. 62. One Truck, 2 1/2 Ton, Amphibian was anchored to a buoy 300 yards off shore as shown in Fig. 63. The materiel on LCTs and LSTs was fastened securely to the decks with 1/2" cables, turnbuckles, or chains as illustrated in Fig. 64, Fig. 65, Fig. 66, Fig. 67, Fig. 68, Fig. 69 and Fig. 70. The items remaining aboard the USS Arkansas, USS Nevada, USS Pennsylvania and USS Saratoga remained in the exact position using the same holding down equipment as in Test Able.

3. Preparation

a. All Artillery on the island, the LCTs and LSTs,

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Fig. 57 - LCT 412 - Beached for Test Baker.



Fig. 58 - Bikini Island - Truck, Auto. Repair, 2 1/2 Ton, 6x6, M8A1, Load A. - Method of display for Test Baker.

56
SECRET

SECRET



Fig. 59 - Bikini Island - Truck, 2 1/2 Ton, 6x6,
Amphibian - Method of display for Test Baker.



Fig. 60 - Bikini Island - Car, Armored, Light, M8 -
Method of display for Test Baker.

57
SECRET

SECRET



Fig. 61 - Bikini Island - Gun, 155mm, M2, w/Carriage,
Gun, 155mm, M1A1 - Displayed in traveling
position for Test Baker.



Fig. 62 - Bikini Island - Carrier, Cargo, M29C -
Displayed for Test Baker.

58
SECRET

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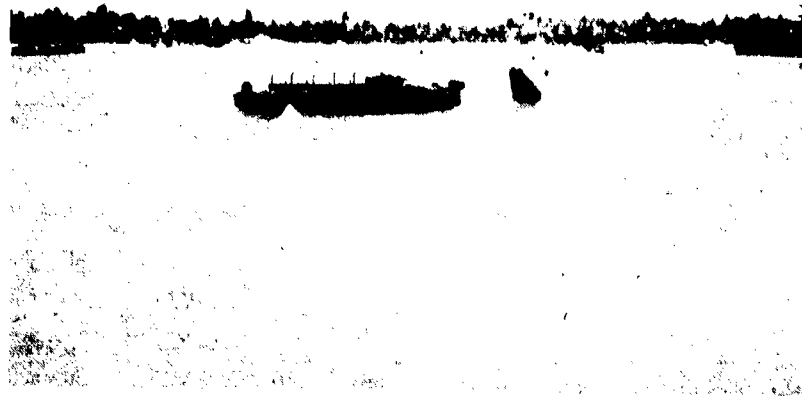


Fig. 63 - Bikini Island - Truck, 2 1/2 Ton, 6x6, Amphibian, Anchored to buoy 300 yards off shore.

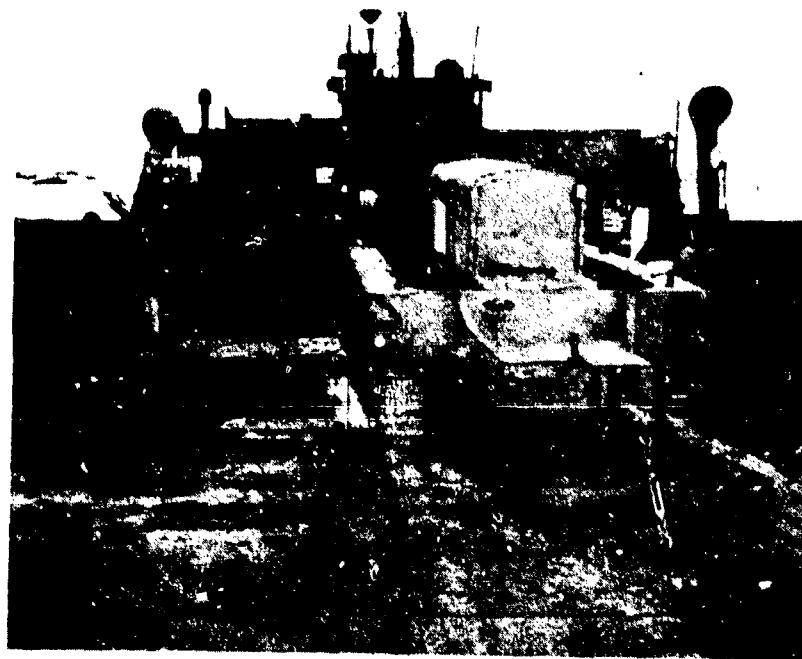


Fig. 64 - LCT 412 - Unit, Generating, M7A1 - Method of securing for Test Baker.

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Fig. 65 - LCT 812 - Gun, 40mm, AA, M1 w/Carriage,
Gun, 40mm, AA, M2A1 - Method of securing
for Test Baker.



Fig. 66 - LCT 812 - Gun, 40mm, AA, M1; Carriage,
Motor, Multiple Gun, M16; and Mortar, 81mm, M1 -
Method of display for Test Baker.

60
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Fig. 67 - LCT 1187 - Car, Armored, Light, M8 - Method of securing for Test Baker.

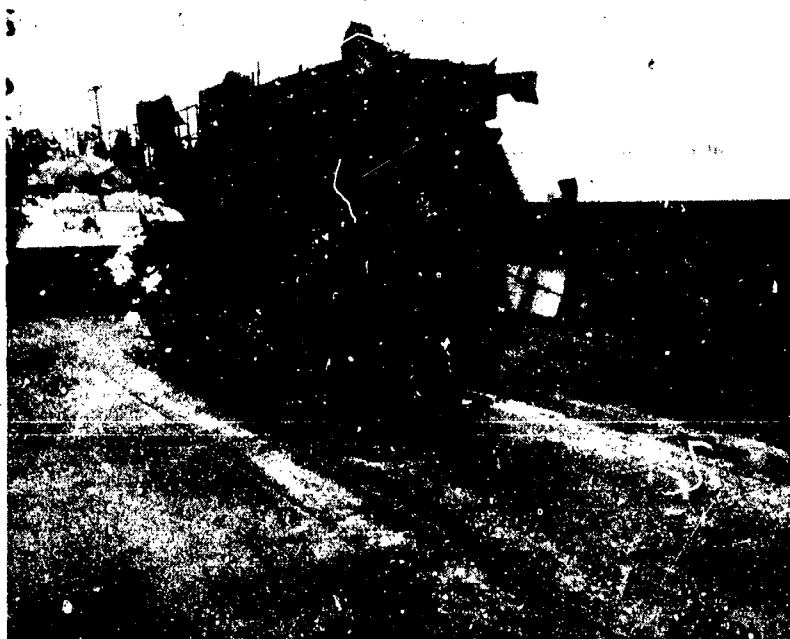


Fig. 68 - LCT 1187 - Carrier, Cargo, W290 - Method of securing for Test Baker.

61
SECRET

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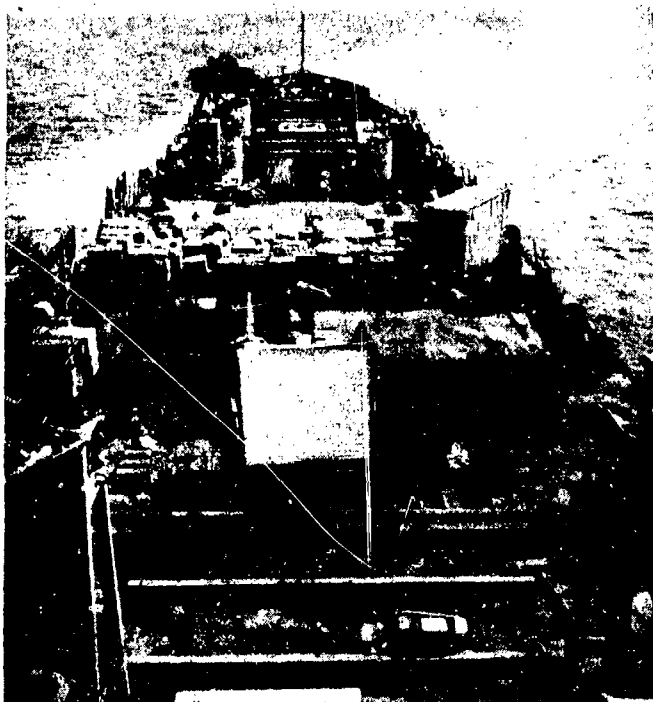


Fig. 69 - LST 545 - Top deck view of Army equipment displayed. Note the Howitzer, 105mm, M2A1 and the Truck, 1/4 Ton, 4x4 amid-ships.



Fig. 70 - LST 125 - Tank deck - Method of securing the Car, Armored, Light, M8; Carriage, Motor, Multiple Gun, M16; and Gun, 40mm, AA, W1.

62
SECRET

SECRET

with the exception of the gun 90mm, AA, M2, w/mount, gun 90mm, AA, M2 and the Mortars, 81mm, M1, which were in travelling position, with covers on, and waterproofed thoroughly for deep water fording. The 90mm, AA, Gun, less outriggers and bogies, was placed on LCT 1113 on 8 inch dunnage as shown in Fig. 71. The 81mm Mortars were in firing position, with covers off, and with exposed metal surfaces treated with light rust preventive as illustrated in Fig. 72. On the USS Arkansas, USS Nevada, USS Pennsylvania, and USS Saratoga the artillery was prepared for 90 days open storage in the Bikini area. Breeches and muzzles were taped and sealed and all exposed metal surfaces treated with heavy preservative.

b. All automotive materiel, with the exception of that on the USS Arkansas, USS Nevada, USS Pennsylvania, and USS Saratoga was waterproofed for deep water fording. The items on the major ships were prepared for 90 days open storage in the Bikini area. Hatch covers, turrets, engine compartment door vents, and open muzzles, were sealed and waterproofed. Inside exposed metal surfaces were coated with light rust preventive and engines were treated with engine preservative oil.

c. Small arms and fire control instruments, on the combat vehicles and artillery prepared for deep water fording were sealed in position with the vinylite covers from the waterproofing kits. Where the primary test item was prepared for storage and shipment, the fire control and small arms items were preserved and placed in the sealed accessory chest, or within the compartments provided for them in the materiel.

SECRET



Fig. 71 - LCT 1113 - Gun, 90mm, AA, M2 - Method of securing for Test Baker.



Fig. 72 - LCT 812 - Mortar, 81mm, M1 - Method of securing in firing position for Test Baker.

64
SECRET

SECRET

SECTION V

ANALYSIS OF TEST RESULTS

65
SECRET

SECRET

V. ANALYSIS OF TEST RESULTS

A. GENERAL

1. Altho the purpose of this report is to describe the damages to ordnance resulting from the atomic bomb and to assess to some degree the significance of the damages, the report would be incomplete unless the readers attention were not also directed to the scope of the bomb's effect.

2. In perusing the report the reader will note that altho numerous instances of damage to ordnance materiel are recorded, their character and their importance is generally of a minor nature when they are considered in the scope of a large field operation. There seems little doubt that the atomic bomb is a weapon to be used against strategic targets, cities, harbors, manufacturing areas. The user of the bomb could thereby capitalize on the bomb's terrible physiological effect on personnel and its ability, by virtue of its capacity to spread radioactivity, to deny the use of a strategic area, which it had contaminated, to the enemy.

3. Like no other weapon known to man, the multiple effects of the bomb; namely blast, heat, and poisonous contamination, make it so efficient against strategic targets that its use against tactical targets would be considered foolish unless it was an act of desperation or the situation had assumed strategic importance.

4. Considering the above argument it seems mandatory that the effort of the Army to profit from Operation Crossroads can best be directed toward remedying the defense of strategical areas, developing decontaminating methods, and building structures and cities less vulnerable to the bomb's wide spread effects.

B. ARTILLERY

1. General

a. Except for the Rocket Launcher, T66E2, displayed on the USS Arkansas and USS Nevada, the basic artillery components, e.g. the carriage, gun, and recoil mechanism, were undamaged. A round could have been fired from all pieces immediately. Generally, unmasked artillery within 600 yards from the bomb burst, was rendered unfit for precision firing because of damage to fire control components. Large scale drawings of the disposition of the Artillery materiel on the decks of the USS Arkansas, USS Nevada, USS Pennsylvania and USS Saratoga are shown in Appendix E. Reference to these drawings will give a picture of the Ordnance materiel placement aboard the

SECRET

several ships and the amount of masking given each by the ships structure or other interferences on the deck. It is generally interpreted that blast is purely directional and if the flow is interrupted by masking, any damage that occurs on the other side of the masking is usually attributed to pressure. Such was not always the case in this test. So many interferences, such as turrets, ventilators, masts, etc., were present on the decks of the ships that the blast was deflected in many cases and damage was caused by blast where the items were actually masked. On the other hand radiant heat appeared to be entirely directional. In cases where an item was partially shielded a sharp line between scorched and unscorched material was visible. The best indication of this condition was on the wooden decks of the ships. Even for distances of 10 yards and more, the scorched area of the unmasked deck was sharply noticeable from the unscorched masked deck. Some heat accompanied the blast wave of course, but the intensity did not appear enough to burn or scorch masked paints, metals or wood, although the theory that fabrics, such as the aiming stake cover displayed on the 105mm Howitzer on the USS Arkansas, was weakened first by scorching before parting from blast, is subscribed to.

b. Table of damage sustained by artillery materiel at distances from the Able Atomic Bomb burst:

<u>Materiel</u>	<u>Ship:</u> <u>Approx. Distance:</u>	<u>Ark</u> <u>600 Yd</u>	<u>Nev</u> <u>600 Yd</u>	<u>Penn</u> <u>1500 Yd</u>	<u>Sara</u> <u>2300 Yd</u>
Gun, 40mm AA, M2		IF	IF	R	R
Gun, 90mm AA, M2		IF	IF	R	R
Gun, 155mm, M2		R	R	R	R
Howitzer, 105mm M2A1		R	IF	R	R
Launcher, Rocket, T66E2		IAP	IA	R	R
Mortar, 81mm, M1		R	R	R	R

Symbols:

IA- Immobilized as a result of basic artillery damage
 IF- Immobilized as a result of damaged fire control items
 R- Ready for action

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g. Per cent of masking afforded artillery materiel from Able Bomb burst:

<u>Materiel</u>	<u>Ship:</u> <u>Approx. Distance:</u>	<u>Ark</u>	<u>Nev</u>	<u>Penn</u>	<u>Sara</u>
		<u>600 Yd</u>	<u>600 Yd</u>	<u>1600 Yd</u>	<u>2300 Yd</u>
Gun, 40mm, AA, M2		100%	100%	98%	0%
Gun, 90mm, AA, M2		0%	50%	10%	0%
Gun, 155mm, M2		90%	0%	0%	0%
Howitzer, 105mm, M2A1		100%	0%	95%	0%
Launcher, Rocket T66E2		0%	60%	80%	0%
Mortar, 81mm, M1		100%	0%	100%	0%

d. No real damage was apparent to the pneumatic tires of the artillery materiel but it is deemed advisable that a sample be submitted to a qualified laboratory for chemical analysis and other samples be tested for endurance and serviceability. It is recommended that the battery left tire of the Rocket Launcher, T66E2, displayed on the USS Arkansas, be used for the specimen as this particular carriage was the nearest and most exposed Artillery materiel to the bomb burst.

e. It was noted that generally, rubber eye guards were blown from unmasked Fire Control equipment within 600 yards of the bomb burst.

2. Gun, 40mm, AA, M1, w/Mount, Gun, 40mm, M2A1 (item 22). It will be noted that all of the 40mm AA materiel, with the exception of that mounted on the USS Saratoga, was shielded completely from the direct force of the Atomic Bomb. Most damage was of a secondary nature caused by falling debris. Damage to the 40mm fire control components on the USS Arkansas and the jamming of the Computing Sight, was traceable to secondary damage to the linkage. The twisting of the ring sights on the USS Nevada however, was a direct result of blast. No damage occurred on either the USS Pennsylvania or the USS Saratoga.

3. Gun, 90mm, AA, M2, w/Mount, Gun, 90mm, AA, M2, w/Recoil Mechanism, M17 and Fuse Setter Rammer, M20 (item 23). Damage which rendered the materiel unfit for precision firing was confined entirely to the Fire Control equipment. On the USS Arkansas: the Sighting System M7 bracket and rest was struck on the right side by a foreign object causing distortion of the telescope mount bracket and bending of the forehead rest; the Telescope M60 was also struck by flying debris, bending the mount bracket base and damaging it beyond repair; the lens separation of the Telescope, M60, is directly traceable to the heat from the burst. The Indicator Regulator, M1, damage on the USS Arkansas and the USS Nevada was caused by blast pushing the glass windows against the dials, bending them inward against the

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spiders. When the gun was traversed and elevated during inspection the spiders were caught and twisted beyond repair. Even though the secondary damage can be largely attributed to the unnatural display of the materiel, it is evident that the blast damage to the Indicator Regulators would have occurred even if the materiel had been displayed in its proper field emplacement at the same distance from the burst. The mechanical damage did not immobilize the weapon. One peculiar event occurred on the USS Arkansas and the USS Nevada when upon reboarding, it was found that the top carriage of the 90mm AA materiel had traversed approximately 45 degrees and 30 degrees respectively, through a spur and bevel gear train, away from the direction of the blast. Yet the 40mm AA materiel located approximately 20 yds distant, but shielded, had not traversed any notable amount though free to move merely by hand pressure on the muzzle end of the gun tube. The explanation advanced is that the 90mm splinter shields being of large area furnished the surface against which the blast could work effectively in traversing the mount, while the 40mm AA materiel had no large flat areas upon which the blast or pressure could act. The broken traversing handle on the USS Nevada materiel is explained by centrifugal force acting on the inertia of the handle when the mount was traversed violently and suddenly by the blast. The elevating and traversing handles on the USS Arkansas materiel were in their stowed places on the front splinter shield and therefore no effect was evident from the violent traversing of the top carriage. The 90mm AA materiel on the USS Arkansas was one of the most exposed items of materiel displayed and is thought worthy of laboratory study. Though outwardly no metallurgical change or damage to the recoil mechanism is apparent it is recommended that the gun tube, Serial No. 2569, and Recoil Mechanism M17, No. 736, sent to the Ordnance Research and Development Center, Aberdeen Proving Ground, Md. with the test item, be disassembled and shipped to the Metallurgical Laboratory at Watertown Arsenal, Watertown, Mass., for analysis and study. The Fuse Setter Rammer, M20, No. 260, and Carriage, 90mm, AA, M2, No. 633, from the test should be disassembled and examined at the Research Center, paying particular attention to the springs of the rammer and equilibrators which should be given a complete measurement and cyclic test. It is further recommended that similar disposition be made of the 90mm AA, materiel test item displayed on the USS Nevada, after a 10 round firing program at several elevations.

4. Gun, 155mm, M2, w/Carriage, Gun, 155mm, M1 and Recoil Mechanism, M3, (Item 24). The only damage to this materiel was minor; the breaking of the level vial on the Gunner's Quadrant, M1, displayed on the USS Arkansas. It was the only case of this damage occurring of several level vials displayed on the USS Arkansas. The Quadrant was wired to the exterior of the breech ring which is certainly not the normal position in action. If the Quadrant had been returned to its case, slung from the gunner's

SECRET

shoulder, it is believed this damage would never have occurred. The Panoramic Telescope assembled to the 155mm materiel on the USS Nevada suffered a cracked objective window, caused probably by heat rather than blast considering the small area exposed. This damage did not prohibit the use of the piece. If firing of the piece had been desired immediately the broken window could have been removed to permit use of the telescope for a limited time.

5. Howitzer, 105mm, M2A1, w/Carriage, Howitzer, 105mm, M2A2, and Recoil Mechanism, M2A1, (Item 25). The damage to the weapon was not sufficient to immobilize the piece on any ship. Damage to the Panoramic Telescope, M1A2, reticle, and Elbow Telescope, M16A1C, displayed on the USS Nevada materiel did immobilize the weapon for precision fire. Breakage of the shields on the USS Arkansas and USS Nevada, in no way affected functioning of the basic Artillery materiel. The limiting of elevation to 430 mils caused by distortion of the top shield on the piece displayed on the USS Nevada could be remedied within a few minutes. There is no doubt that the damage was a result of blast acting upon the large shield area. The tilted reticle of the Panoramic Telescope M1A2 displayed on the USS Nevada, was undoubtedly caused by concussion as no evidence could be found of flying debris contacting the telescope with sufficient violence to cause the damage. Separation of the field lens in the Elbow Telescope is traced to breakdown of the cement from heat. The 105mm materiel on the USS Nevada was 100% exposed and is deemed a good subject for further investigation. It is recommended that the Howitzer be sent to the Ordnance Research and Development Center, Aberdeen Proving Ground, Md., for further disassembly and shipment to the Metallurgical Laboratories, Watertown Arsenal, Watertown, Mass., for metallurgical analysis of Howitzer, 105mm, M2A1, No. 537, and Recoil Mechanism, Howitzer, 105mm, M2A1, No. 6353. The Carriage, Howitzer, 105mm, M2A2, No. 4008, should be given a complete disassembly and inspection at the Research Center paying particular attention to any change in the equilibrators spring. It is further recommended that the same disposition be made of the 105mm Howitzer materiel displayed on the USS Arkansas, at the conclusion of a 10 round firing program at several elevations.

6. Launcher, Rocket, 4.5", T66E2 (Item 26). A combination of blast and flexing of the deck was responsible for the shearing of the 1/2" bolts in the elevating and traversing mechanism bracket on the USS Nevada, while a combination of blast and striking the left trail by the ships accommodation ladder platform was probably responsible for similar damage on the USS Arkansas. The fact that both pieces were pointed directly at the blast is common to both displays. It is probable that the blast contacting the open ends of the tubes exerted a downward pressure on the front end of the tube nest. In the case of the USS Nevada, the deck

SECRET

flexing downward at the point where the trail ends were fastened, carried the trail ends downward violently. In the case of the USS Arkansas, the left trail was struck downward by the accommodation ladder platform, which also accounted for bending the left wheel. A simultaneous combination of these forces would cause the failures experienced. Damage to the Fire Control equipment is self explanatory. The scorching of the scales on the telescope mount and the elbow telescope on the USS Arkansas rendered them illegible. Blast was evidently responsible for parting the extension light wire on the item displayed on the USS Nevada.

7. Mortar, 81mm, M1, (Item 27). Damage to the Sight M4 occurred on both the USS Arkansas and USS Nevada and was caused by blast and heat respectively. Actually if the requirement was great enough, the materiel could be fired effectively utilizing the level vial for range and the V sight for azimuth offsets.

C. TANK AND AUTOMOTIVE

1. Of the twenty (20) armored vehicles displayed in Test Able, only one, the Multiple Gun Motor Carriage, M16, on the USS Arkansas, was considered unserviceable. This was due only to the damaged multiple machine gun mount which would not operate. The M45 Multiple Machine Gun Mounts at 600 yards were both directly exposed and damaged by blast. The sighting equipment, generator gas tank, battery rack, trunnion covers, and front armor retaining bolts, were too frail to withstand the pressures involved. The mount on the USS Arkansas, would not operate in a combat situation because of the loss of the generator and sight as well as the failure of the machine guns to fire. On the USS Nevada the loss of the sight would not render the mount useless for effective combat. The rest of the unit was capable of firing. A discussion of the machine guns on these mounts may be found under subparagraph E. 2., this section. In all cases, however, the vehicle itself would operate satisfactorily.

a. The most damage occurred to light gage metal, such as sandshields, fenders, stowage boxes, radio aerials, and periscope covers, which were broken, bent or torn on practically all items but without affecting the operation of the vehicle.

b. Of a more serious nature was the forcing open of the driver's and assistant driver's hatches and the forcing of the engine compartment doors into the fighting compartments which occurred on all armored vehicles at 600 yards and to some at 1600 yards. The blast entered the vehicle through the engine louvres at the rear, pushed the engine compartment doors into the fighting compartment by pulling the securing pins through their sheet metal fastening and then after tearing up the floor boards in

SECRET

the fighting compartments and scattering them about, forced open the hatches by the increased pressure within the vehicle. It is evident that the crews of the vehicles within 600 yards of the blast would have suffered injuries and in some instances could not have survived.

2. Most of the damage to general purpose vehicles was caused by blast pressure, and aggravated by the lashings which rigidly secured the vehicles to the deck, preventing the vehicles from rolling or skidding with the blast as they probably would have done in a natural situation. This was particularly evident when viewing the damage to the jeep on the USS Arkansas and the DUKW's on the USS Arkansas & USS Nevada. The jeep on the USS Arkansas was lashed to the deck by a turnbuckle through the rear right safety chain eye. The blast coming in at the rear of the vehicle tore the body loose from and twisted the frame, see Fig. 73. In the case of the DUKW's the vehicle was fastened to the deck by a cable through the front lifting eyes and in being blown upwards by the blast, which in both instances hit the surf board at the front of the vehicle, the cable caused the sides and top of the hull at the front hatch cover to buckle inwards, see Fig. 74.

a. The damage sustained by the Automotive Repair Truck M8A1 was caused mainly by its high silhouette and light construction. Most damage was centered about the truck body on all four vessels. On the USS Arkansas and USS Nevada, at 600 yards, the truck body was demolished. At distances of 1600 yards and 2300 yards the truck body was only slightly damaged. In the latter case the body could easily be repaired and in fact would not preclude the use of the vehicle. The damage to the balance of these vehicles, at ranges up to 600 yards, was greatly aggravated by the lashings which bent the frames. See Fig. 75.

b. Although the above vehicles were seriously damaged, the tires mounted thereon were apparently unaffected. Four tires, one from the Truck, 1/4 ton, 4x4, one from the Automotive Repair Truck, 2 1/2 ton, 6x6, and two from the DUKW, were returned to the Paint and Auto Chemical Laboratory, Aberdeen Proving Ground, Md. for analysis. It was noted that shielding of vehicles did not render them safe from damage. The Jeep, Weasel and Light Tank M-24, for example, were damaged on the USS Arkansas and the USS Nevada, and yet were shielded by either turrets or the superstructure. The most common damage to the engine accessories was the breaking of carburetors and air intake systems at their bases caused by the bomb blast. The ignition systems and fuel lines were in good order and were unaffected by the blast.

SECRET



Fig. 73 - USS Arkansas - Truck, 1/4 Ton, 4x4.

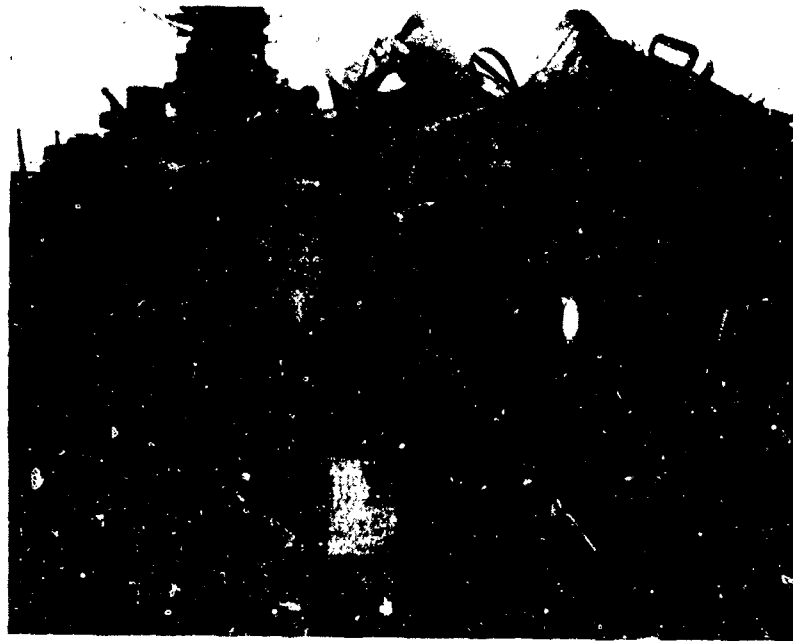


Fig. 74 - USS Nevada - Truck, 2 1/2 Ton, 6x6,
Amphibian.

73
SECRET

SECRET



Fig. 75 - USS Arkansas - Truck, Auto.
Repair, 2 1/2 Ton, 6x6, M8A1 -
Left front wheel and frame damage.

SECRET

g. The most prevalent damage to the Cargo Carrier, M29C, was the crushing of the bow and stern cells and the forcing of the hull floor pan (Cargo compartment) down onto the control rods which occurred up to 1600 yards from the bomb. At 600 yards this vehicle was un-serviceable not only because of the aforementioned damage but also because of damage to the engine. In these two instances the distributor caps were broken, the air cleaner bent, and some wiring torn loose. At 1600 yards and 2300 yards, this vehicle was serviceable.

3. The following table shows the relation of vehicle to shielding.

a. Table

Item No.	Nomenclature	U.S.S. Arkansas	U.S.S. Nevada	U.S.S. Pennsylvania	U.S.S. Saratoga
55	Car, Armored, Light, M-8	No	Partially	Yes	No
56	Carriage, Gun Motor, Multiple, M16	No	Partially	Yes	No
57	Carriage, Gun Motor, 90mm, M36	Partially	No	Partially	No
58	Carrier, Cargo, M29C	Yes	Yes	No	No
59	Tank, Heavy, M26	Yes	Partially	Yes	No
60	Tank, Light, M24	Yes	Yes	No	No
61	Truck, 1/4 Ton, 4x4	Yes	Partially	Yes	No
62	Truck, Amphibian, 2 1/2 Ton, 6 x 6	No	No	No	No
63	Truck, Auto Repair, 2 1/2 Ton, 6x6, M8A1	Partially	No	No	No

b. Shielding of vehicles did not protect the vehicles, especially general purpose vehicles, from damage. In the case of the Truck, 1/4 ton, 4x4 and the Carrier, Cargo, M29c, aboard the U.S.S. Arkansas, considerable damage was sustained although they were completely masked by Turrets No. 5 and 6. This was equally true aboard the U.S.S. Nevada although the damage was less extensive.

D. FIRE CONTROL

1. Finder, Range, M7 (item 34). This instrument was not displayed on its tripod. To prevent loss by the bomb blast carrying it over the side of the ship, it was lashed to a display pallet by steel wire or tape. (see Fig. 30). Although subjected to the direct blast on only the USS Arkansas and the USS Saratoga, the instrument was subjected to the maximum amount of blast and heat in the former case and escaped relatively undamaged. Damage to the range scale reflecting prism on the USS Nevada was almost

SECRET

certainly caused by falling debris and is an indication of the result to be expected if the instrument had been displayed on its tripod. It would undoubtedly have been blown over forcibly by the blast which would probably have rendered the instrument un-serviceable.

2. Finder, Height, M1A1, (item 33). It is highly probable that the maximum damage to the height finder on the Arkansas was caused by a foreign object striking the left carrying handle with considerable force. This damage should not be disregarded because it is an indication of what may be expected if the instrument were tactically employed. The height finder would undoubtedly be blown over violently when exposed to an atomic bomb blast at distances less than a thousand yards. The azimuth indicator windows were shattered on both the USS Arkansas and USS Nevada at a distance of 600 yards. Since operating checks could not be made at Bikini the serviceability of the indicators could not be determined. Results of the further inspection to be made at Frankford Arsenal are not available at this time. It is assumed that the deposit of foreign matter on the optical elements of the tracking telescopes consists of tiny chips of the surfacing used to coat the interior. The carrying cases on both the USS Arkansas and USS Nevada were exposed to the blast. The end covers were open on the USS Arkansas but bolted in place on the USS Nevada. Although equally exposed, the case on the USS Arkansas was relatively undamaged while that on the USS Nevada was collapsed by pressure, (see Fig. 76).

3. Telescope BC, M65 (item 48) No damage occurred that would impair the efficiency of this instrument.

4. Circle, Aiming, M1 (item 29) This item suffered no disabling damage in this test. It is likely however that if it were set up on its tripod in use, secondary damage due to falling would result.

5. Director, M7A1B1 (item 31).

a. The lack of damage inside the director case on the USS Arkansas and the apparent trueness of the present range and present altitude handwheel shafts indicate that the binding found in these handwheels may have been caused when the glass window was smashed in against the present angular height dial. Further tests to be made at Frankford Arsenal will be necessary to determine the serviceability of this director and the extent of damage.

b. On the USS Nevada, the binding found in the present angular height handwheel may have been caused either by blast or by a blow from flying debris. Regardless of which caused this damage it indicates what may be expected if the

SECRET



Fig. 76 - USS Nevada - Height Finder, W1A1 -
Carrying case apparently crushed by
pressure in Test Able.

77
SECRET

SECRET

director were not secured against falling, as would be the case if it were set up on its tripod. The blast from an atomic bomb would be sufficient at distances of 600 yards to violently overturn the instrument. The binding of the prediction arresting button is frequent even on those directors not exposed to atomic bombing and should not be considered as a special effect therefrom. The foreign matter in the right telescope could very well have been particles of the telescope's interior coating, flaked loose by the shock of the blast. This foreign matter has been a rather common effect, noticeable in a number of optical instruments exposed to this blast.

g. A slight drag was evident in the present angular height and present azimuth handwheels of the Director, M7A1 on the USS Pennsylvania. Here again it was not possible to determine the exact cause but it is assumed that the smashing of dial windows against the dial faces contributed.

6. Director, M9A2 (item 32). The damage to this item on all ships was similar in nature but lessened in severity as the distance from the burst increased. On the USS Arkansas, the M9A2, Director as a unit, was uneconomically repairable; on the USS Nevada it required slightly less extensive repair; on the USS Pennsylvania, only minor repairs were necessary; and on the USS Saratoga, insignificant damage resulted.

a. The correction panels of the Computers on the USS Arkansas and USS Nevada were rendered useless by blast shattering the meters. Broken tubes and cracked terminal strip covers on the USS Arkansas, USS Nevada, and USS Pennsylvania resulted from the computer side covers crushing in against them. Cracked terminal strip covers, however did not disable the computer as demonstrated on the USS Pennsylvania by satisfactory computer operation after the broken tube was replaced. The more extensive damage on the USS Arkansas was attributed to the computer being torn from its mounting and striking the trailer side with sufficient violence to sharply bend the computer frame. The framework was twisted somewhat by the blast before the mounting snapped and accounts partially for shifted units, broken wiring and the destruction of those tubes crushed by the displaced units.

b. The Altitude Converters, on the USS Arkansas and USS Nevada were torn from their locations over the power units and thrown to the deck. The side panels and microammeter were crushed inward by blast on the USS Arkansas. Further damage on both the USS Arkansas and USS Nevada resulted from the fall to the deck. Complete assessment of this damage will not be possible until the analysis by Frankford Arsenal is completed. The Altitude Converters on the USS Pennsylvania and USS Saratoga

SECRET

operated without repair.

c. As in the case of the computer, a number of tubes in the Power Unit, M8, were crushed by the side covers on both the USS Arkansas and USS Nevada. Crushed tube sockets on the USS Arkansas are traceable to the same cause. The bolts holding the transformer unit in place could have been sheared as the frame was momentarily twisted before the power unit trailer mountings were broken. Several wires were broken as the transformer unit was displaced from its normal position. The power unit top, to which the altitude converter was attached, was torn free when the latter was dislodged.

d. Exterior damage to the Trackers on the USS Arkansas, USS Nevada, and USS Pennsylvania consisted mainly of the blast crushing inward the sheet metal cover. On the USS Arkansas this crushing on top forced the servo cover down until it rested against the contact spider. Damage to the spider connections resulted when the tracker was traversed during subsequent examination. On the USS Nevada a level vial was broken by the inward displacement of the cover. The above damage could be repaired to the extent of making the trackers operable but complete repair by replacing the case would be necessary to make them weatherproof. The moisture and dirt found in the telescopes on the USS Nevada would not prevent use in an emergency but replacement or repair would be necessary. The illegibility of the diopter scales on the USS Arkansas telescopes was inconvenient rather than disabling as were also the sheared seat locking knobs. It is quite probable that the trackers and their tripods would be upset and damaged when exposed at distances less than 1000 yards from an atomic bomb burst.

e. All trailers showed the effects of blast on their large, paneled areas. This effect diminished considerably as the distance increased. At 1600 yards, only slight bulging of walls and broken windows resulted. This bulging of walls on the USS Pennsylvania caused the ventilating fan to strike its housing. Although the trailer on the USS Arkansas was towable, its usefulness as a protection against the weather was destroyed. The top section of the trailer was torn free and the lower body was distorted in the direction of the blast. The heating, ventilating, and lighting systems were demolished when the tracker top section was crushed and carried away. The body damage on the Trailer, M13, displayed on the USS Nevada, was less extensive since the M13 model is an uncovered trailer and thus presents less surface against which the blast could act. Shifting of the trailers on the USS Arkansas and USS Nevada damaged the leveling jacks. It is felt that trailer frame damage on the USS Nevada would have been eliminated had the trailer been free to roll or slide. The tie-downs caused

SECRET

a twist in the frame when the trailer wheel was forced onto its chock. Flash heat rendered those reflectors unserviceable that were exposed to the blast at distances up to 1600 yards.

7. Unit, Generating, M7A1 (item 52).

a. Blast was responsible for the major damage to this item along with the allied effect of flying debris. It was impossible to discover just how the radiator of the M7A1 Generating Unit on the USS Arkansas was ripped from its left side support but it seems reasonable to assume that it was caused by a combination of forces from the blast, plus the inertia of the heavy radiator when the sidewise movement of the trailer was suddenly stopped by the side of a special deck splash pan. The force of this motion and sudden stopping was further illustrated by broken engine supports and right rear wheel hub. The chance of this combination of circumstances existing under normal conditions of operation is relatively remote. The damage to the cast side members and bottom tank of the radiator were traceable to the radiator striking the side of the trailer violently. (See Fig. 77). The displacing of the radiator likewise accounts for the damage to the fan and the gear case to which the fan bracket is attached.

b. When the cover panels were carried away on the USS Arkansas and USS Nevada, they may have struck the top radiator hose causing breakages at the cast outlet on the radiator top. Spare hoses are supplied with the equipment and are easily replaced. It is also quite possible that the side panels struck the top radiator support rods, tearing the bosses from the radiator top tank.

c. Since damage to the electrical system was limited to easily repaired items, little consideration need be given here. In only one case was a spark plug damaged, probably snapped off by flying debris. Spare plugs are supplied with the vehicle at the present time and are easily replaced. Except for the spark plug wires, the ignition wiring of the engine was shielded by the engine block. The limited damage to that wiring exposed indicates that no unrepairable damage will be caused. The coil could be easily relocated by lowering it to lessen the chances of secondary damage.

d. Three possibilities exist for the breakage in the fuel intake and carburetion system. There was similar breakage on the USS Arkansas and USS Nevada. Possible contributing circumstances were likewise similar. They may have been struck by the side panels as they were carried away by the blast. The unit, consisting of air filter and carburetor presents a high silhouette with a comparatively broad surface against which the blast can act and is supported at only one end

SECRET



Fig. 77 - USS Arkansas - Unit, Generating, W7A1 -
Damage from Test Able.

81
SECRET

SECRET

by a relatively weak "link". The blast acting on this broad surface after the protecting panels were carried away, may have caused the breakage. Lastly, both generating units were subjected to a considerable shock incident to their movement sidewise. The inertia of the relatively heavy carburetion unit caused the maximum moment to be exerted again at its weakest point. The possibility of damage could be lessened by relocating the air filter lower along the left side of the engine. A change in shape or size would be necessary to accomodate it to the space. A heavier construction is also desirable at the throttle box and body or supplemental supports are needed on the carburetor itself.

e. The damage sustained by the generator instrument panel was limited to that caused by its dislocation and by glass breakage. Since in all cases the panel was located on the side of the generator unit away from the point of detonation, it is questionable that further damage would have resulted if the position had been reversed. Similar gages on exposed instrument panels of vehicles were largely undamaged and it is reasonable to believe that such would also be the case here. In any event, even though the gages had been damaged the operation of the unit would be little affected.

f. It is highly probable that had the trailer been free to skid without obstruction, the frame damage on the USS Nevada and the broken wheel encountered on the USS Arkansas would not have occurred. Although not certain, it is quite possible that the frame damage occurred because of the twisting exerted by the left rear wheel climbing the chock. Skidding with the blast would in most cases bend the leveling jack legs though this would not affect the generator operation. The jacks on the USS Arkansas in two cases were bent 90° or more without breaking but could have been straightened for use again if desired. The breakage and distortion of the tail gate would cause a slight inconvenience but would otherwise not affect the unit's operation. Likewise the bending of certain of the body metal would be unsightly rather than affecting the function of the trailer.

g. System, Cable, M1 (item 45). The cuts noticeable in the cables displayed on the USS Nevada were from a secondary source that would normally be absent when the cables are in actual use. The only other effect, the slight scorching, can also be discounted since it apparently in no way affected the elasticity or insulating qualities of the rubber sheath. These cables have been sent to Frankford Arsenal for a more complete inspection.

SECRET

8. Telescope, T108E2 (item 47).

a. Although only the telescopes displayed on the USS Arkansas and USS Saratoga were directly exposed, the result in both cases indicates that no damage of a nature to cause unserviceability may be expected. In no case were the plastic lenses exposed directly to the heat from the bomb.

b. Damage to other sights and telescopes (secondary items) is discussed elsewhere in this report with the major item on which they were displayed.

9. Binocular, M15A1 (item 28). Unless the binoculars were in actual use and thus out of their case no damage would have been sustained by this item. In the case of those displayed on the USS Arkansas, the superficial damage sustained by the plastic body was caused by heat from the burst softening the plastic for a short time. This heat passes so quickly that with the binoculars in the carrying case it is very doubtful whether even this effect would have occurred, since in similar cases any protection at all prevented heat damage.

10. Timepieces.

a. The Message Center Clocks, M1, (item 30) sustained no significant damage. In each instance where the clock was directly exposed the wooden cabinet was charred or scorched depending on its distance from the bomb. Since the clock was securely fastened to the display pallet, secondary damage from falling was eliminated.

b. No damage was suffered by the Watch, Pocket, (item 53) from effects caused by the Atomic Bomb. In the case of the watch displayed on the USS Nevada, the erratic operation noted in section VI of this report was noticeable before the watch was sent for repair. When the watch was returned, it was impossible to check its operation over a length of time before the test. Since this watch was shielded from direct exposure to the blast it seems logical to assume that the erratic condition existed before the bombing. Further this item would not normally be in a position to receive direct exposure to the bomb.

c. The Watch, Wrist, (item 56) as in the case of the pocket watch will usually be partially shielded in use. Damage on the USS Arkansas appears to have been caused by heat shrinking or distorting the plastic crystal. The stoppage resulting from the melting of the luminous paint on this watch is equally a remote possibility with the watch in use, since even a layer of cloth provided protection against heat damage.

SECRET

B. SMALL ARMS AND AIRCRAFT ARMAMENT

1. Masking: The following table shows the masking of the various small arms test items displayed.

	<u>USS Arkansas</u>	<u>USS Nevada</u>	<u>USS Pennsylvania</u>	<u>USS Saratoga</u>
Direction of Exposure	45° After Stb'd Quarter, Angle High.	45° After Port Quarter, Angle High	30° After Port Quarter, Angle Low	Directly Aft. Angle Low.
Masking of Pallets	No	Yes	Partially	No
Masking of 75mm AC, M10	Yes	No	Yes	Yes
Masking of Parachest Equip.	No	Yes	Yes	No

This table is based on personal observations both of the items themselves and of adjacent portions of the ships.

2. Damage from Direct Causes.

a. With only three exceptions out of a total of 121 items of Small Arms of all types, none had their essential military characteristics impaired as a direct result of the Test Able bombing. One Cal. .50 Browning Machine Gun on a Light Armored Car, M8, at a distance of 600 yards from the bomb burst was incapable of functioning because the side plates of its receiver were deformed, thus restricting the movement of the internal mechanism. This same gun was also deformed at the barrel supporting bearing preventing the free functioning of the barrel in recoil. Another Cal. 50 Heavy Barrel Machine Gun M2 on a Multiple Machine Gun Mount M45 at the same distance was similarly damaged but to a lesser degree. Upon disassembly, it was noted that the side plates of the receiver were also deformed. However, this gun was reassembled and would function although it is not known whether it will fire. In the absence of laboratory tests of the hardness and heat treatment of the affected parts, it may be presumed that these guns were rendered inoperative due to blast effect alone. Each was held rigidly during the test and felt the full effect of the blast and heat without any masking. In case a hardness test proves that the metal in these receivers had been altered, it may then be assumed that heat or the combination of heat and blast caused the damage. These two guns, as well as the others mounted on armored vehicles on the same ship, presented a shiny appearance not usually associated with phosphate finishes and leads one to suspect that there may have been a metallurgical change, however slight, at least on the surface structure

SECRET

of these guns. For a discussion as to the effect of the loss of these guns to the armored vehicles see paragraph V B.

b. The breakdown, by heat, of the cement in the optical elements in the M81 telescope with the U.S. Rifle, M1C, at a distance of 1600 yards left this piece no longer a sniper's rifle. However, the gun itself with its iron sights still could be classed as a functioning weapon.

3. Damage from Secondary Causes.

a. Two Browning Machine Guns on armored vehicles at a distance of 600 yards were rendered functionally inoperative when they were struck by flying debris. Another cause of damage was demonstrated when a machine gun in the anti-aircraft position on a tank was lifted out of its mount and carried by the blast to the top of a ship's gun turret 15 feet away. In this particular case no damage was done but this may be regarded only as chance. A 75mm aircraft cannon at a distance of 600 yards became badly damaged when it was strained in its position by the buckling of the deck under it. Examination indicates that this piece suffered little if any, from the direct exposure to the bomb burst.

b. By far the most pronounced secondary effect on the Small Arms display was corrosion. The surfaces of these weapons are finished by bluing or Parkerizing. These finishes will be free from corrosion only as long as a light coat of preservative is left on them. The flash heat of the atomic bomb explosion dried off this preservative on all exposed surfaces leaving the gun parts thus affected subject to immediate rusting. A condition of this kind is not serious if attended to in a short time. In this test, all weapons were reached in time to stop the attack of rust before any item was permanently harmed. However, if more time had elapsed before the ships were boarded most of the Small Arms displayed would have been permanently rendered useless. Although this drying effect becomes less, the greater the distance from the burst, all weapons were affected.

c. A greater factor than distance from the bomb burst is the presence and the amount of masking. Even the slightest masking is sufficient to temper the heat effect. This was demonstrated graphically on the USS Pennsylvania at 1600 yards where the display pallets were partially masked by some of the ship's structure in

SECRET

such a way that the exposure to the bomb was diagonally from corner to corner of the pallets. The difference between oiled and dried guns could easily be seen to follow this line. In several instances, a single weapon was affected in this way. Other examples of this were noted on the larger materiel. Where the preservative oils were removed, rust had set in on the steel components, the amount depending on the finish. Phosphate coating appears to be much better than bluing in resisting this condition. Blued finishes became badly rusted, the rust often covering an entire item. In this category were the Shotgun, Riot Type, the tube and mount to the M81 or M82 Telescope and the magazines for the Carbine, Submachine Gun and Automatic Rifle. In contrast to this the other guns only rusted, if at all, where salt spray actually fell on the surfaces. Three guns that withstood rusting the best were the Recoilless Rifle, M20, the 20 mm Automatic Gun and the cal. 60 Machine Gun. In all cases, oils and greases remained in the bores and inside the mechanism even at distances as close as 600 yards.

4. Materials.

a. No differential effects between metals were noted. Magnesium, aluminum, stainless steel, and brass, in addition to the conventional steels, were present in the Small Arms display. The plastic stock on the automatic rifle and the plastic grips on the pistol stood up well even where exposed as close as 600 yards. Wood, such as in the stocks of the shoulder weapons, was charred slightly. There was no evidence of any of the wood having actually burned. The charring was only "skin-deep" and the surface was restored by slight sandpapering. On the other hand, leather and rubber inclined to crack and become brittle. Glass, as represented by lenses in the sighting equipment, did not crack. In the one instance already mentioned in paragraph 1 above, the cement was affected at a distance of about 1600 yards. This represents only the one failure out of a total of sixteen sighting instruments in the Small Arms displays. At least eight of these instruments were somewhat closer to the bomb. Again, as in the case of the preservative oils, the effect to any material was lessened as the item was masked or was further away from the bomb burst. A graphic example of this was seen on the display at 1600 yards. The Pistol Holster was set between a Rocket Launcher and a Machine Gun and this small amount of masking proved to be sufficient protection to leave the holster untouched whereas the cheek pad on the M1C Rifle, less than 24" away on the same pallet but not shielded, was surface charred. The materials composing the display at 600

SECRET

yards were checked with a Geiger Counter four days after exposure and were found not dangerously radioactive.

5. Materiel Lost

a. Of the 121 items in the test, two were lost. The Parachest and Paracaisson on the USS Nevada, at a distance of about 600 yards were torn from their lashings by the blast. The Parachest was carried overboard. The Paracaisson was stopped when it hit a stanchion. The Paracaisson on the USS Arkansas was lost from secondary causes when a large range finder hit it sometime after the explosion but before the reboarding. The important point in this discussion is that objects of large area and light weight will be caught by the blast and carried away. The fact that a Browning Machine Gun with its cradle was lifted from its mount and deposited some fifteen feet away at a higher level, at a distance of 600 yards from the blast, would indicate that the Small Arms displays would certainly have been dispersed, with numerous items lost, had they not been secured by strapping.

6. Summary

a. Approximately 75% of the 121 primary and secondary items of the Small Arms materiel in the Able Bomb Test were directly exposed to the heat and blast effect at distances varying from 600 yards to a maximum of 2300 yards. These figures include the machine guns mounted on the combat vehicles. Damages are summarized in the following table:

	<u>Number</u>	<u>Percentage</u>
Lost due to bomb action	2	1
Damaged by bomb action	3	2.5
Damaged by secondary action	5	4
Damaged or lost before test	3	2.5
Restorable to first class shape in short time	108	90

Of these totals, only one, a Browning Machine Gun, was irreparably damaged. The 90% considered restorable in the above table were rendered fit for reissue by first echelon maintenance in two to three days. Most of these were capable of their military function without any maintenance whatever.

SECRET

F. AMMUNITION AND EXPLOSIVES

1. **Heat Effects** - Heat was responsible for virtually all damage to ammunition, but was found to lose its damaging effect on ammunition at approximately 2500 yards from the center of the explosion. This is substantiated by the complete absence of damage caused by heat to ammunition displayed aboard the LST 220, which was anchored approximately 3300 yards from the point of bomb burst. Minor heat effect, causing exposed propellant increments (composed of double-base ballistite powder) to be destroyed by burning, was observed on the LST 661 anchored in the same direction as the LST 220, at a distance of 2300 yards from the center of the explosion. No other heat damage was noted aboard the LST 661 except as noted in Section VI.
2. **Blast Effects** - Blast was responsible for a negligible amount of the damage sustained by the ammunition and its effect was dissipated at approximately 2000 yards from the center of the explosion. The complete absence of blast damage on the LST 661, which was anchored at 2300 yards from the center of the explosion, substantiates this observation. Blast effect caused several items on the YOG 83 and LST 52 to be displaced and other items to break the metal strapping used to secure them to the pallets.
3. **Pressure Effects** - There were no apparent pressure effects noted on any ammunition items displayed.
4. **Secondary Damage Effects** - The secondary damage sustained was not considered significant in that it was caused by the shifting of the ships equipment on the target ships. The secondary damage sustained would not be the damage sustained by ammunition in storage or in a field operation.
5. **Radiological Effects** - There were no radiological effects noted on any of the ammunition items displayed.
6. The effects of an atomic bomb on ammunition in a field operation would be much different from the effects that were sustained on board the target ships. On board the ships, the ammunition was firmly secured to the deck in an exposed position, in various stages of packaging such as; bare, in a fiber container, and in a wooden box or a metal container. In a field operation, ammunition would not normally be stored under those conditions. Packaged ammunition stacked in open storage in the field would be scattered and extensively damaged by the impact of the blast pressure as well as the secondary damage incurred when the ammunition packages strike and fall on one another. This damage would probably so outweigh the damage that occurred when the ammunition was exposed to the flash heat of an atomic bomb aboard the ships that the heat damage could be considered insignificant.

SECRET

Ammunition stored in under ground magazines or igloos should not be affected by either heat or blast effect, beyond 500 yards distance.

List of Ammunition Items masked on the various ships

<u>Item No</u>	<u>Ship:</u>	<u>YOG 83</u>	<u>LST 52</u>	<u>LST 661</u>
	<u>Distance:</u>	<u>1000 Yd</u>	<u>1500 Yd</u>	<u>2300 Yd</u>
4		U	M	U
10		U	P	U
12		U	M	U
13		U	P	U
26		U	P	U
29		U	U	P
36		P	U	U
44		P	U	U
45		U	U	P
46		U	U	P
47		U	P	P
48		P	U	P
60		P	P	P
65		P	U	U
66		P	U	U
67		P	U	U
68		P	U	U
69		P	P	U
81		U	U	P
87		P	U	U
88		P	U	U
89		U	P	U
90		U	P	U
91		U	P	U
92		M	P	U
93		M	U	U
94		M	U	U
95		M	U	U
96		M	U	U
97		P	U	U
98		M	U	U
99		M	U	U
100		M	U	U
101		M	U	U
102		M	U	U
103		M	U	U
104		M	U	U
105		M	U	U
106		M	U	U
107		P	U	U
110		P	U	U

SECRET

<u>Item No</u>	<u>Ship: Distance:</u>	<u>YOG 83</u>	<u>LST 52</u>	<u>LST 661</u>
		<u>1000 Yd</u>	<u>1500 Yd</u>	<u>2300 Yd</u>
111		P	U	U
112		P	U	U
117		P	U	U
124		U	P	U
127		U	P	U
133		U	P	U
137		U	U	P
138		U	U	P
139		U	M	U
141		M	U	U
142		U	P	U
148		P	U	U
150		U	P	U
151		U	P	U
152		U	M	U
154		P	U	P
155		M	U	U
156		M	U	U
157		M	U	U
158		M	U	U
159		P	U	U
160		P	U	U
161		P	U	P
162		P	U	P
164		U	P	U
165		U	P	U
174		M	M	U
195		U	U	M
202		U	U	P

U - denotes unmasked items
P - denotes partially masked items
M - denotes completely masked items

7. Effects of Masking. - The effects of masking were especially pronounced on the YOG 83 as the bomb burst to the rear and to the starboard of this ship. As a consequence, almost all of the "B" group items were shielded by the boat deck and wheelhouse. Except for the combustion of the 155 propelling charges all items were so shielded that no significant damage was sustained except from secondary causes as noted in Section VI. Masking was noted from such thin objects as the metal strapping. The masking marks made

SECRET

by these metal straps are clearly visible on many boxes.

8. Although there were no heat, blast, radiological, or pressure effects beyond 2300 yards (LST 661) the items inside this radius were not affected so that their stability or rate of detonation was impaired. Such items as Fuzes, Flares, Miners, Safety Fuse, Detonating Cord, Electric Blasting Caps, Concussion Detonation Fuzes and Non-electric Blasting Caps, though scorched, warred and damaged in appearance by the effects of the atomic bomb, functioned normally when fired. Most of the other items displayed were returned to Picatinny Arsenal and Frankford Arsenal for further tests both in the laboratory and on the proving ground.

9. Although there were no radiological, pressure or secondary effects apparent on the rubber samples, the final decision concerning possible internal change of the composition awaits the laboratory analysis. At 800 yards, the rubber samples were scorched while those on the LST 52 at 1500 yards were not damaged. Under 1500 yards, several samples of the rubber were displaced or blown overboard by the blast pressures.

G. TEST BAKER

1. Evidence on the beach of Bikini Island indicated that a wave varying from five to ten feet in height swept the beach several minutes after the Atomic bomb explosion. The wave was not of sufficient size or duration to capsize or swamp any of the craft containing Ordnance equipment, nor was it large enough to reach any of the equipment displayed on the high ground of the island. The Amphibian truck (DUKW) anchored 100 yards off shore was not swamped nor its efficiency impaired in any way. It started and operated without difficulty. The only evidence of damage to Ordnance equipment was secondary damage to the M-8 Armored Car aboard the LCT 1187. The LCT had settled by the stern in shallow water so five days the Armored Car was immersed in 4 feet of water at high tide as shown in Fig. 78. The Armored Car would not start when removed from the LCT, but after a thorough cleaning was placed in serviceable condition. It is probable that, had personnel been able to proceed to the beach immediately following the explosion, the M8 Armored Car could have been recovered without damage.

2. Evidence on the USS Pennsylvania and USS Nevada in the target array indicated great quantities of radio active water descended upon them for a number of minutes following the explosion. A period of two weeks elapsed before these ships were cleared radiologically for a limited inspection of the top side. During this two weeks period several attempts were made by Navy salvage tugs to reduce radioactivity on the weather decks. The operation consisted of washing down the ship with streams of salt water alone

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Fig. 78 - LCT 1187 - Car, Armored, Light, M8 -
Position in LCT with respect to high
tide mark.

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and several solutions containing boiler compound, lye, and foamite respectively. The streams of water were of sufficient intensity to remove some of the sealing and waterproofing material from the tanks and artillery and to fill the engine and drivers compartments to a depth of 18". This trapped salt water was not radioactive, which fact would lead us to believe that it resulted from the washing down operation rather than from the spray from the bomb explosion itself. The canvas material used in connection with sealing the top of the tank destroyers and engine compartment doors was found to be highly radioactive, having a tolerance of only 5 minutes, but the remainder of the surfaces of the materiel had a much higher tolerance than the weather surfaces of the ships themselves. A hurried visual inspection of the materiel indicated it would be reasonably serviceable after some maintenance work. No other damage was noted that could be attributed to the direct effect of the bomb explosion.

3. Listed below are items of Ordnance equipment lost due to the sinking of the USS Saratoga and the USS Arkansas.

<u>Item No.</u>	<u>Serial No.</u>	<u>Nomenclature</u>
23	1916	Gun, 90mm, AA, M2, W/Mount, Gun, 90mm, AA, M2
24	705	Gun, 155mm, M2, W/Carriage, Gun, 155mm, M1A1
24	1235	Gun, 155mm, M2, W/Carriage, Gun, 155mm, M1A1
45	---	System, Cable, M1 (2 sets)
57	1495	Carriage, Motor, Gun, 90mm, M36
57	64210	Carriage, Motor, Gun, 90mm, M36
59	2081	Tank, Heavy, M26
59	1861	Tank, Heavy, M26
60	4150	Tank, Light, M24

SECRET

SECTION VI

FACTUAL ACCOUNT OF TEST RESULTS

94

SECRET

SECRET

VI. FACTUAL ACCOUNT OF TEST RESULTS

A. ARTILLERY

1. Gun, 40mm, AA, M2, w/Mount, Gun, 40mm, AA, M2A1
(Item 22), equipped with the following fire control items:

	<u>Ark.</u>	<u>Nev.</u>	<u>Penn.</u>	<u>Sera.</u>
Quadrant, Gunners, M1	X	X	X	X
Sight, Computing, M7A1	X	X	X	X
Telescope, M7 (two)		X	X	
System, Remote Control, M15	X	X	X	X
System, Cable, M8	X			
System, Sighting, M3				X

a. The item displayed on the USS Arkansas was entirely masked from the bomb. All damage was secondary, caused by flying or falling debris. Damage consisted of: misalignment of rubber covered coupling in the horizontal shaft to the elevating power unit, and loosening of all holding bolts permitting movement of the elevating power unit; right rear platform bent downward; bent traversing and elevating operator's seats, caused by pressure; and missing hood and shield assemblies. Manual elevating and traversing was satisfactory, as was operation of the rammer, breech block, and firing mechanism. The materiel was quite dirty on the exterior. All preservative materials in the tube, breech, rammer and elevating rack were examined, visually and by feel and apparently suffered no breakdown. With slight straightening and cleaning the materiel could go into immediate combat. The power elements of the carriage were not operated because no director or generator was available. While the power elevating mechanism could operate through the bent coupling mentioned above, it would be inadvisable. For hand operation the coupling could be disconnected. A wooden splinter approximately one inch in diameter was found imbedded in the sidewall of the right front tire, see Fig. 79. The deck around the gun carriage showed no evidence of scorching and none was present on the materiel. The peep sight on the elevation side of the Computing Sight, M7A1, was made unusable by the linkage breaking on that side, see Fig. 80. The azimuth side ring sight was bent backward, see Fig. 81. The super elevation linkage was bent and the deflection linkage broken, see Fig. 80. The arrow on the computing mechanism jammed at "0" azimuth and the deflection computing mechanism jammed at 75 mph.

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Fig. 79 - USS Arkansas - Carriage, 40mm, AA, M2A1 -
View of deformed platform and operators seat.
Note wood imbedded in right front tire side wall.



Fig. 80 - USS Arkansas - Computing Sight, M7A1 on 40mm
Gun, M1 - Secondary damage to telescope mount
and connecting bar on left side.

96
SECRET

SECRET



Fig. 81 -- USS Arkansas - Computing Sight, M7A1 on
40mm Gun, M1 - Secondary damage, from falling
cable, to ring sight on right side.

SECRET

b. Like the USS Arkansas, the materiel on the USS Nevada was entirely masked from the bomb. Most damage was secondary caused by flying debris. Damage consisted of: badly deformed traversing and elevating operators' seats, caused by pressure; bent vertical shaft universal joint below the traversing gear box; bent case trough; bent motor switch linkage; bent elevation limit switch; bent elevating handle; bent slewing handle frame; and missing hood and shield assemblies, see Fig. 82 and Fig. 83. Manual elevating and traversing was satisfactory as was the operation of the rammer, breech block, and firing mechanism. The materiel was quite dirty on the exterior. All preservative materials in the tube, breech rammer, and elevating rack were examined visually and by feel and apparently suffered no breakdown. The preservative in the bore and Breech Gun Casing particularly was in good condition. With slight straightening and cleaning this material could go into immediate combat. The foregoing statement refers only to the mechanical operation of the weapon. No director or generator was available to test the power operation, but no damage to the hydraulic elevating or traversing equipment was noted which would indicate malfunction on their part. The ring sights of the Computing Sight, M7A1, were twisted out of alignment, see Fig. 84. Moisture was found between the field and eye lenses of one of the M7 telescopes making it unserviceable and the eye lens of the other was chipped. The latter however was still serviceable.

c. The materiel was undamaged on both the USS Pennsylvania and the USS Saratoga. On the USS Pennsylvania a Vinylite cover over the muzzle had been burst and peeled back over the tube; approximately two inches of the muzzle end of the tube was the only portion of the materiel exposed. The preservative under the recoil spring on the materiel displayed on the USS Saratoga showed surface melting which smoothed out the lines left from application but nothing more. The Fire Control Components were undamaged.

2. Gun, 90mm, AA, M2, w/Mount, Gun, 90mm, AA, M2 (Item 23), equipped with:

System, Sighting, M7
Telescope, M60, (two)
Indicator, Regulator, M1 (two)
Combination Fuse Setter Rammer, M20
Amplifier, Torque, M1
Setter, Fuse, M13

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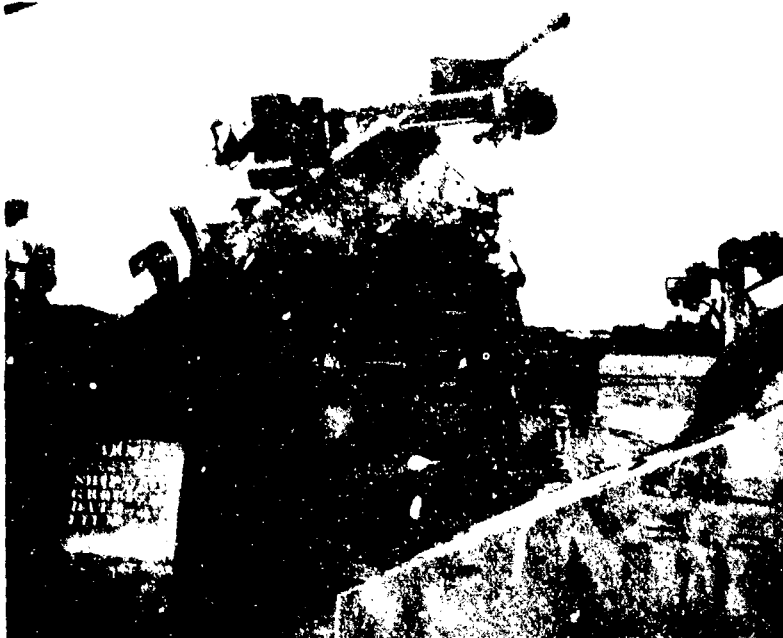


Fig. 82 - USS Nevada - Carriage, 40mm, AA, M2A1 -
Right rear view showing bent case guide and
traversing operating handle. Note sheet metal
debris wrapped around breech casing.

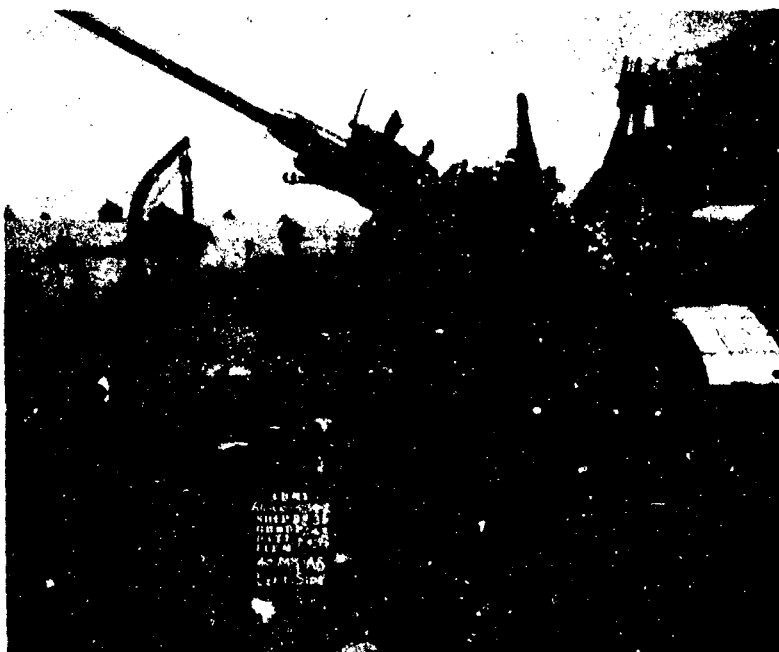


Fig. 83 - USS Nevada - Carriage, 40mm, AA, M2A1 -
Left side view showing bent operator's seat.

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Fig. 84 - USS Nevada - Computing Sight, W7A1 on
40mm Gun, M1 - Crumpled ring sight and
twisted telescope mount on the elevation side.

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a. On the USS Arkansas the materiel was directly exposed. The force of the blast traversed the mount 45 degrees from the original position. Damage sustained included: deformation of the right front floor plate; the elevation operator's seat; the right splinter shield catch broken; and the light metal cover, over the oil level indicator of the elevation power unit, blown directly upward, see Fig. 85. Operation of the top carriage was hampered by the dials of the elevating and traversing indicators which were blown inward, partially jamming the gearing. Sufficient operation in elevation, depression, and traverse was done to indicate that no malfunction is present in manual operation. The breech block and firing mechanism functioned satisfactorily. Neither the fuze setter rammer nor the power elevating and traversing units were operated because a serviceable director and generator were not available for the test. The deck around the item was charred to a depth of 1/32". The paint, on the right and front splinter shields, top and side of the tube facing the blast, was discolored a reddish brown. The preservative on the elevating rack and on exposed surfaces of the breech ring breech block and fuze setter rammer was burned off but that in the chamber and tube, tested visually and by feel, had apparently suffered no breakdown. The materiel could be fired and maneuvered by manual operation, after removal of the indicators. A pint of recoil oil was drawn from the recoil mechanism for chemical analysis. Damage to Fire Control materiel included the elevation telescope mount bracket of the Sighting System, M7, bent inward at the top and the forehead rest bent inward and down, see Fig. 86. The lower part of the elevation Telescope, M60 was twisted, the reticle cracked, and the filter adapter bent. The instrument was not repairable. The cover glasses of the Indicator Regulators, M1, were smashed inward against the dials, bending the latter, see Fig. 87, Fig. 88, Fig. 89 and Fig. 90. When the gun was manually traversed and elevated, the bent dials caught the spiders, twisting them beyond repair, see Fig. 91, Fig. 92 and Fig. 93. The orienting wheels were jammed.

b. The item displayed aboard the USS Nevada was masked by very light material such as aircraft and the Automotive Shop Truck, an estimate of approximately 50% effective masking is made. Damage to mechanical operation consisted of a traversing handle, broken at the first joint from the hub, evidently by flying debris, see Fig. 94 and Fig. 95. All preservatives in the bore, chamber, breech recess and interior of the power rammer,

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Fig. 85 - USS Arkansas - Mount, Gun, 90mm, M2-
Deformation of elevation operator's seat,
floor plate, and breakage of side shield latch catch.

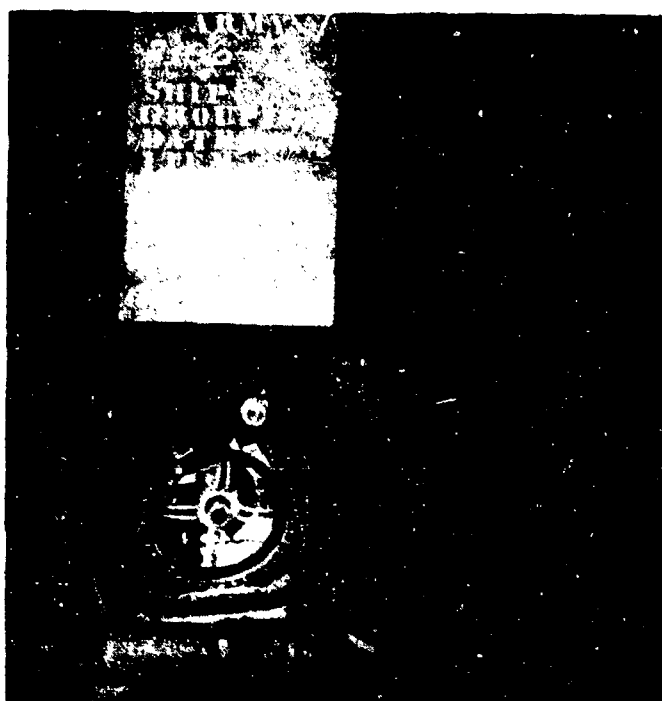


Fig. 86 - USS Arkansas - Sighting System, M7
on 90mm Gun, M2 - Damage to forehead
rest and mount bracket.

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Fig. 87 - USS Arkansas - Indicator Regulator, M1
on 90mm Gun, M2 - Smashed cover glass
over dials on elevation side, caused by blast.



Fig. 88 - USS Arkansas - Indicator Regulator,
M1 on 90mm Gun, M2 - Smashed cover
glass on azimuth side.

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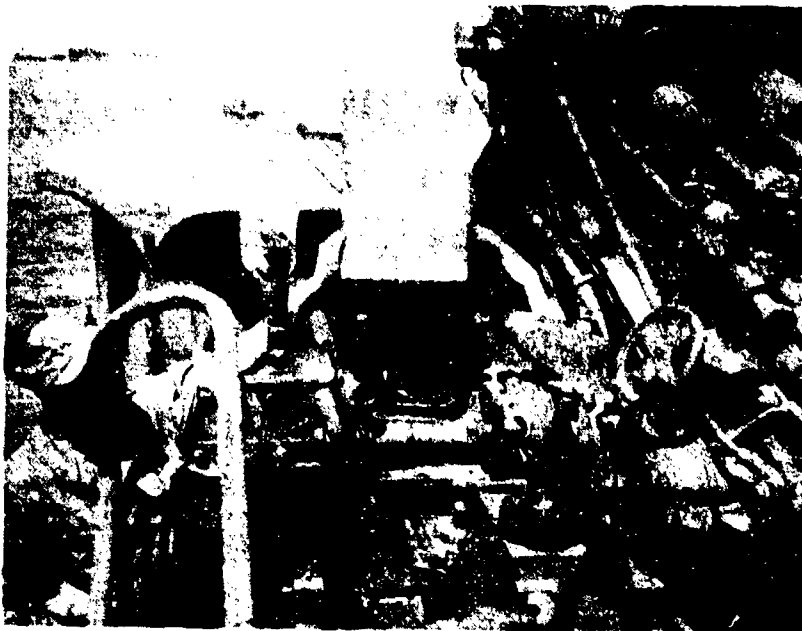


Fig. 89 - USS Nevada - Indicator Regulators, M1 on 90mm Gun, M2- Smashed cover glass on azimuth side removed to show crumpled dials.



Fig. 90 - USS Nevada - Indicator Regulator, M1 on 90mm Gun, M2 - Cover glass on elevation side smashed by blast.

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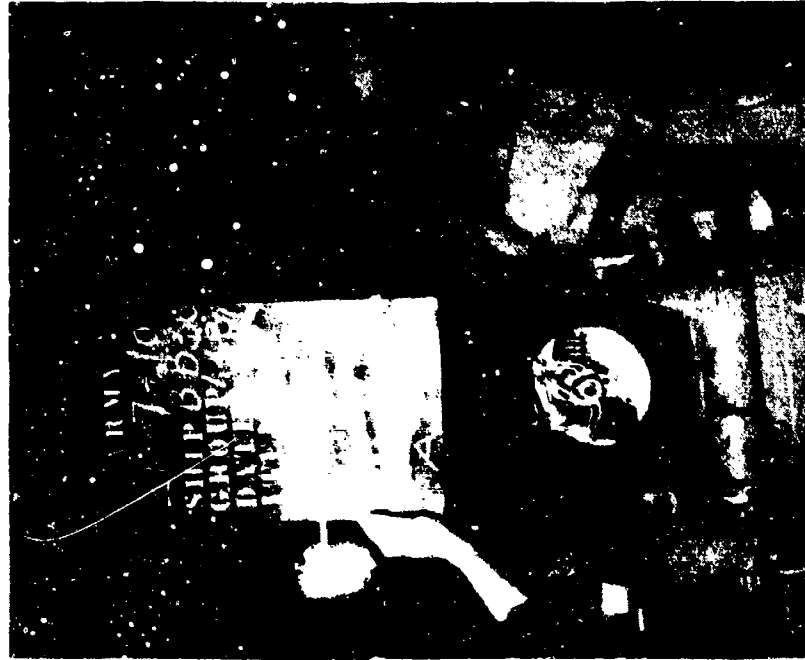


Fig. 92 - USS Nevada - Indicator Regulator, M1 on 90mm Gun, M2 - View showing twisted spider on azimuth side after the shattered glass was removed.

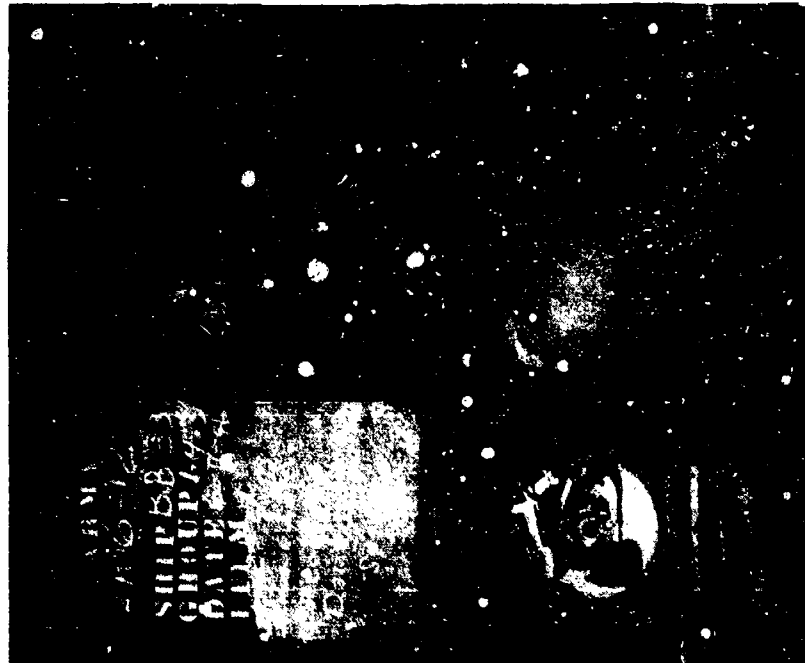


Fig. 91 - USS Arkansas - Indicator Regulator, M1 on 90mm Gun, M2 - View showing twisted spider on azimuth side after the shattered glass was removed.

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Fig. 93 - USS Nevada - Indicator Regulator, M1
on 90mm Gun, M2 - View on elevation side
after shattered glass was removed.

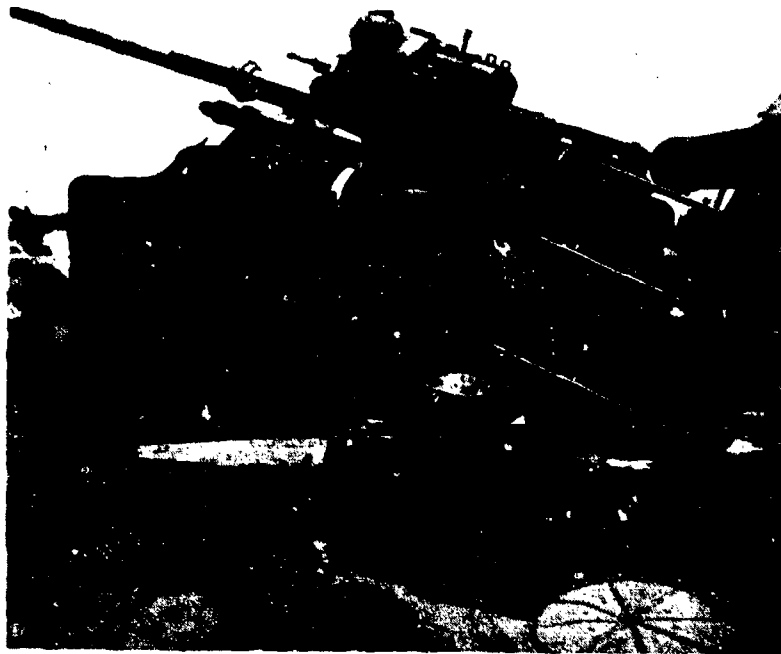


Fig. 94 - USS Nevada - Mount, Gun, 90mm, M2 -
Left side view after Test Able.

106
SECRET

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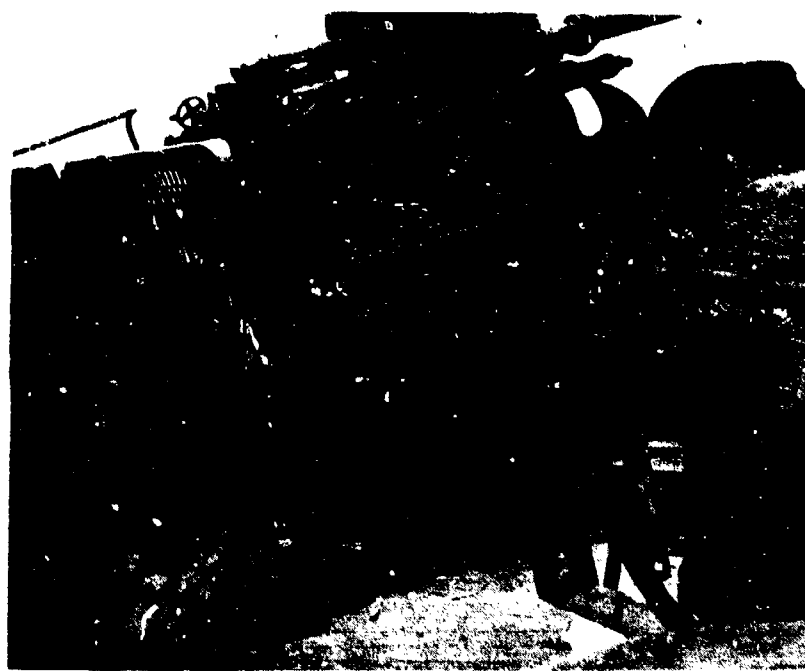


Fig. 95 - USS Nevada - Mount, Gun, 90mm, M2 -
Right rear view. Note deformed operator's
seat.

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and on the elevating rack, were examined visually and by feel. No breakdown was apparent. The preservative on the exterior moving parts of the fuze setter rammer was melted off on the side exposed to the burst. The generator and director for this materiel was completely ruined, therefore no test of the fuze setter rammer can be made to determine its functioning until the return of the materiel to the Proving Ground. Sufficient traversing and elevating of the gun was accomplished to determine that these mechanisms functioned satisfactorily by hand. Complete operation was not attempted because the dials of the elevating and traversing indicators were smashed in, partially jamming the interior gearing. Blast was evidently responsible for traversing the top carriage approximately 30 degrees left from the position set. Both side splinter shields had been blown forward from their closed position. Operation of the block and firing mechanism was satisfactory. The U-bolts fastening the gun mount to the deck were broken at the bends or where a spacer piece had been welded to them, see Fig. 96. The fact that the breaks occurred in areas where heat or stress had been applied, indicated that the rods were high tensile steel and had not been properly stress relief annealed and treated. Evidence of flexing of the deck was quite prevalent in this particular area which probably contributed to the stresses on the U-bolts. Disassembly and replacement of the traversing and elevator indicators and the replacement of the traversing handle would permit manual operation. A one pint specimen of the recoil oil was drawn from the recoil mechanism for chemical analysis. Damage to the fire control materiel included the identical damage to the indicator regulators that was experienced on the Arkansas, except that the orienting wheels were not jammed. The field lens on both telescopes M60 had begun to separate on Reboarding day. During a fifteen day period after the test the separation did not increase. The rubber eyeguards of the telescopes on both the USS Arkansas and USS Nevada were blown off.

2. The materiel aboard the USS Pennsylvania was 90% exposed but suffered no material damage other than slight paint scorching of the surfaces exposed to the blast. The USS Saratoga mount was completely exposed but suffered no damage whatever. A sample of recoil oil was drawn from each recoil mechanism for chemical analysis.

3. Gun, 155mm, M2, w/Carriage, Gun, 155mm, M1A1 (Item 24), equipped with the Following Fire Control items:

Mount, Quadrant, M1
Mount, Telescope, M18A1

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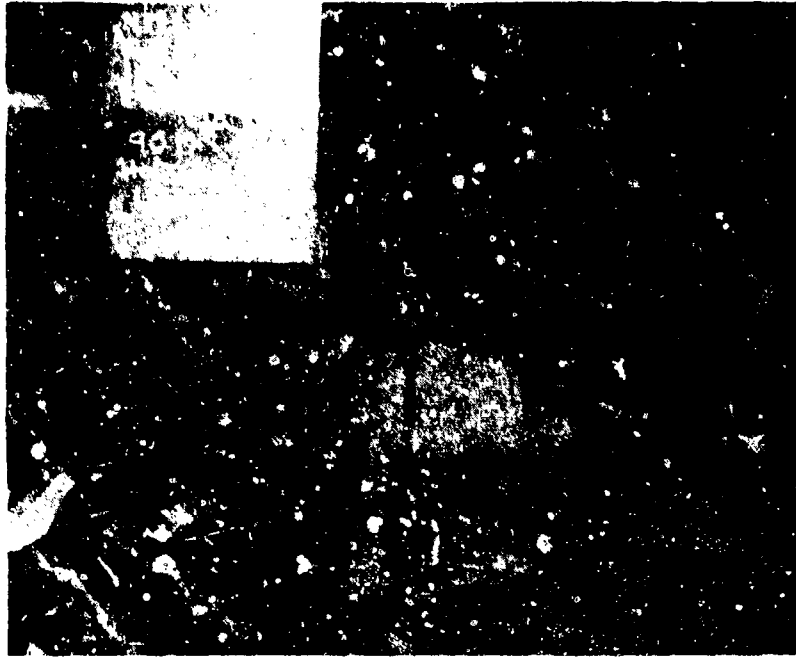


Fig. 96 - USS Nevada - Mount, Gun, 90mm, M2 - View of broken holding down U-bolt.



Fig. 97 - USS Nevada - Carriage, 155mm, M2 - General side view after Test Able.

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Quadrant, Gunners, M1
Telescope, Panoramic, M12 (Item 51)

a. This materiel displayed on the USS Arkansas, except for the end of the tube, was completely masked. Outside of slight blistering of the paint no damage was sustained. The preservative on the equilibrators had dried off but all other preservative in the bore, chamber, breech recess and on the elevating and traversing racks appeared and felt in good condition. All tires were inflated. The elevating and traversing mechanisms functioned perfectly. The Gunners Quadrant, M1, had cracked level vials, rendering it inoperable.

b. On the USS Nevada the 155mm gun, see Fig. 97, was pointed directly at the point of detonation. The only materiel damage was a broken brake hose at the battery right forward diaphragm. The preservative on all interior surfaces, in the bore, chamber, and breech recess, was tested visually and by feel; no breakdown was evident. The heat of the blast melted the exposed preservative on the elevating and traversing rack, and equilibrators. Slight rusting had started on the exposed surfaces prior to return of the crew to the ship. The gun was elevated and traversed, the block and firing mechanism operated, satisfactorily. All tires were still inflated. The Panoramic Telescope, M12, see Fig. 98, was badly scorched and the objective window cracked.

c. On both the USS Pennsylvania and USS Saratoga the 155mm gun materiel was unmasked. Slight paint scorching was noted on the former and the grease on the breech block carrier was slightly affected on the USS Saratoga. No other damage to the artillery components was noted.

4. Howitzer, 105mm, M2A1, w/Carriage, Howitzer, 105mm, M2A2, (Item 25). The following items of fire control equipment were displayed with this weapon:

Mount, Telescope, M21A1 (Item 36)
Mount, Telescope, M23
Quadrant, Gunner's, M1
Quadrant, Range, M4 (Item 42)
Telescope, Elbow, M16A1C (Item 50)
Telescope, Panoramic, M12A2

a. This materiel displayed on the USS Arkansas was shielded completely but damage to it included: breakage of the right front, bottom carriage, splinter shield, A and B, which was also torn from the carriage, stripping ten 3/8"

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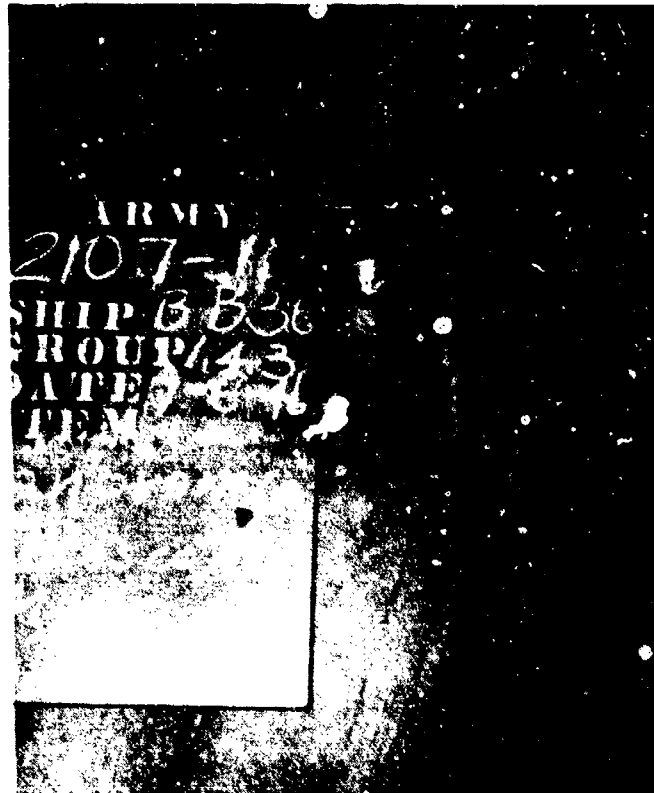


Fig. 98 - USS Nevada - Telescope, Panoramic, M12
from 155mm Gun, M2 - Showing cracked
objective window.

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rivets in the process, and the lower corners, C and D, broken from the drop splinter shield, see Fig. 99. The canvas aiming stake cover was parted along the exposed edge, which was probably weakened first by burning, before parting from the blast effect. The preservative in the tube, breech, and on the shielded equilibrator spring, and elevating rack was in good condition. The preservative on the exposed sliding surface of the sleigh and the exterior of the breech was burned off. The paint exposed to the direction of the blast was burned but paint on opposite surfaces was unaffected. The mount was traversed and elevated, the breech and firing mechanism operated, with no malfunction. The tires were still inflated. The recoil mechanism was not gymnasticated nor manometer tested. Heat scorched the scales of the Range Quadrant, M4, and the Panoramic Telescope, M12A2, making the scales illegible and rendering the instruments useless.

b. The Howitzer as displayed on the USS Nevada was pointed almost directly at the point of detonation with no masking whatever, see Fig. 100 and Fig. 101. The only damage was failure of the lower splinter shield and the hinges holding it to the frontal shield, and misalignment of the top shield prohibiting elevation above 430 mils, see Fig. 102. The preservative was burned off the traversing and elevating racks, exposed sleigh sliding surface, and for approximately two inches within the muzzle end of the tube but only where the heat could contact the interior of the tube without masking. The remainder of the preservative within the tube, chamber, and breech sliding surface was tested visually and by feel with no evidence of breakdown noted. The preservative on the equilibrator spring, masked under the carriage, was smooth indicating surface heating. All tires were inflated. Functioning tests of elevating, depressing, traversing, operation of the breechblock and firing mechanism disclosed no malfunctioning. The recoil mechanism was not gymnasticated nor manometer tested. The scale of the Panoramic Telescope, M12A2, was scorched to the point of illegibility and the reticle tilted. The field lens of the Elbow Telescope M16A1C showed separation. No damage occurred to this materiel on the USS Pennsylvania or the USS Saratoga.

5. Launcher, Rocket, 4.5", T66E2, (Item 26), was equipped with the following items of fire control equipment:

Mount, Telescope, T148E1
Telescope, Elbow, M62

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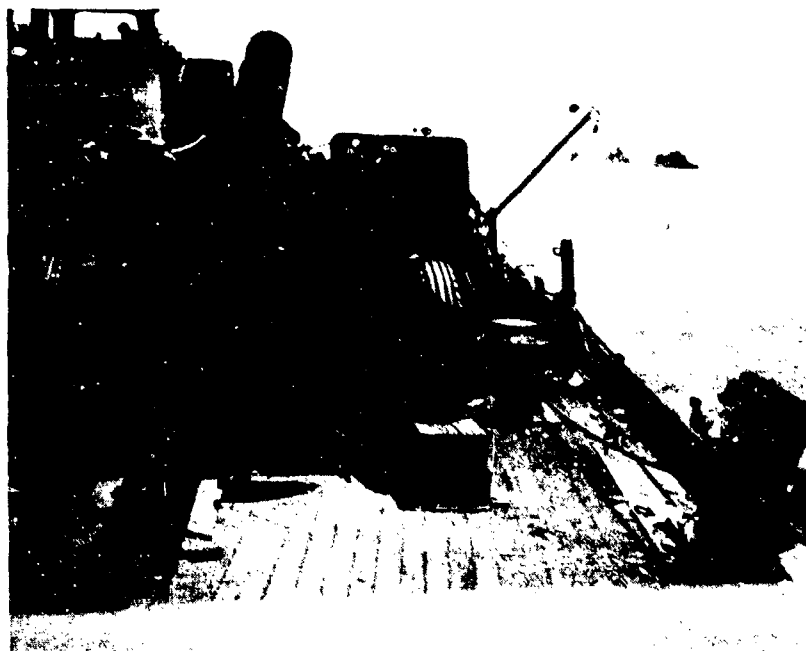


Fig. 99 - USS Arkansas - Howitzer, 105mm M2A1 - Front view showing breakage of corners of apron shield, C and D, and displacement and breakage of top carriage right splinter shield, A and B.



Fig. 100 - USS Nevada - Carriage, Howitzer, 105mm, M2A1 - General rear view after test.

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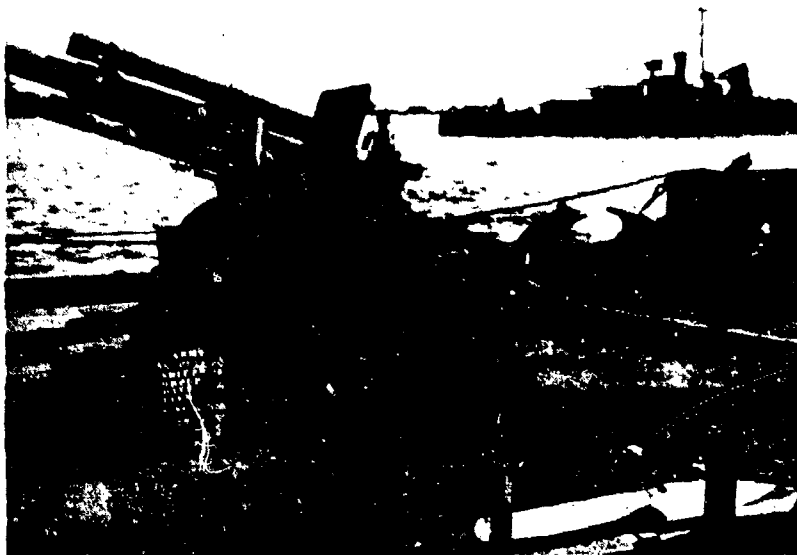


Fig. 101 - USS Nevada - Carriage, Howitzer, 105mm, M2A1 -
General side view after Test.

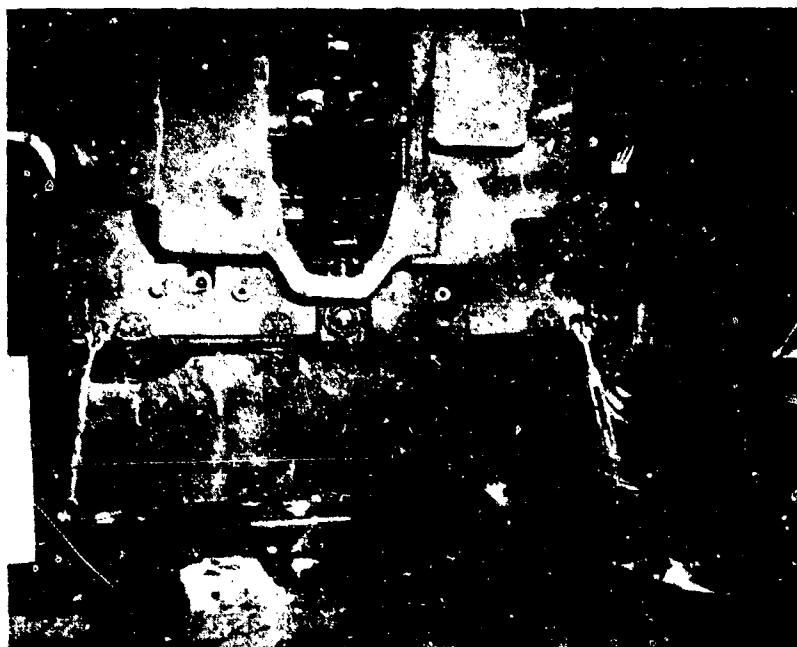


Fig. 102 - USS Nevada - Carriage, Howitzer, 105mm, M2A1 -
Front view showing cracked apron shield and
deformed hinges.

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a. The Rocket Launcher, T66E2, completely unmasked, was the only item of Artillery of the USS Arkansas display immobilized as a direct result of the test. The screwed joint where the elevating mechanism universal is fixed to the bottom carriage structure, was stripped permitting the universal to come loose, see Fig. 103, and thus rendering the elevating mechanism inoperable. The left trail was bent approximately 2 degrees, the left wheel was bent and three studs partially pulled through the disc. The right trail tie rod was broken forward of the turnbuckle and appeared to be a tension break caused by flexing of the deck under the force of pressure. The firing circuits and traversing mechanisms were checked and found satisfactory. The tires were inflated. The deck in this area was charred to a depth of approximately 1/32". The paint on the materiel was subjected to the full effect of the blast which resulted in a general blackening of unshielded surfaces. The scales on the Telescope Mount, T148E1, and Elbow Telescope, M62, were scorched sufficiently to destroy their legibility. The reticle was also unserviceable because of dirt and moisture.

b. Damage to the Launcher, approximately 60% masked, on the USS Nevada was practically identical with that experienced on the USS Arkansas. The elevating mechanism was damaged beyond efficient operation when three 1/2" bolts anchoring the elevating mechanism to the bottom carriage were sheared, see Fig. 104. The accessories box installed on top of the tube nest was deformed by pressure, as shown in Fig. 105. The left trail tie rod was broken immediately forward of the turnbuckle, exactly where the tie rod on the USS Arkansas broke, and appeared to be a tension break at the weld, caused by deformation of the deck. The tires were inflated. The paint was slightly scorched. The damage to Fire Control Components was limited to a broken wire on the extension light of the sight mount.

c. The launcher on the USS Pennsylvania and the USS Saratoga were 80% and 0% masked respectively and experienced no damage whatever.

6. Mortar, 81mm, M1, (Item 37)

a. The Mortar displayed on the USS Arkansas was masked from the blast by the ship's starboard aircastle. No evidence of breakdown of preservative was evident. The materiel functioned perfectly in every detail with the exception of the Sight, M4, which was rendered unserviceable by bending of the collimating sight.

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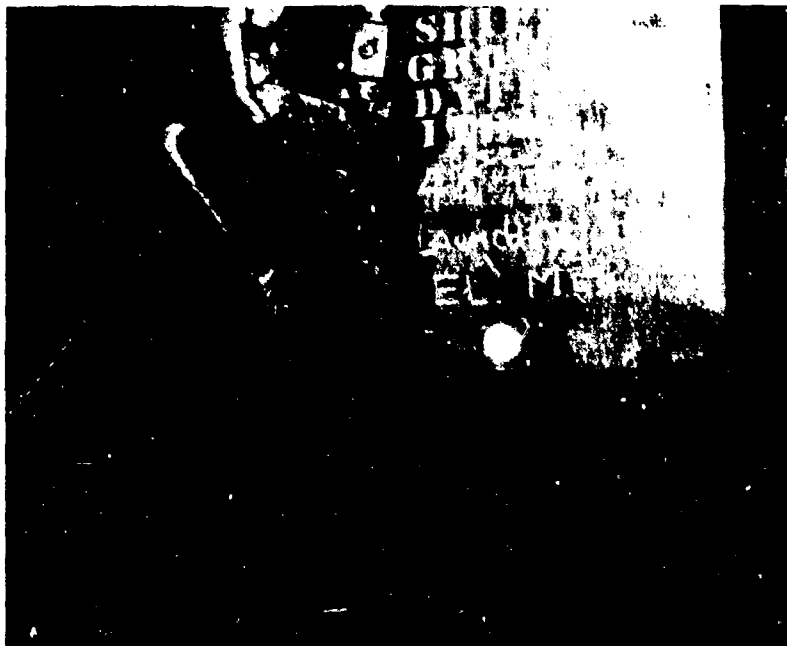


Fig. 103 - USS Arkansas - Launcher, Rocket, 4.5", T66E2 -
Detail of malfunction at elevating mechanism yoke.

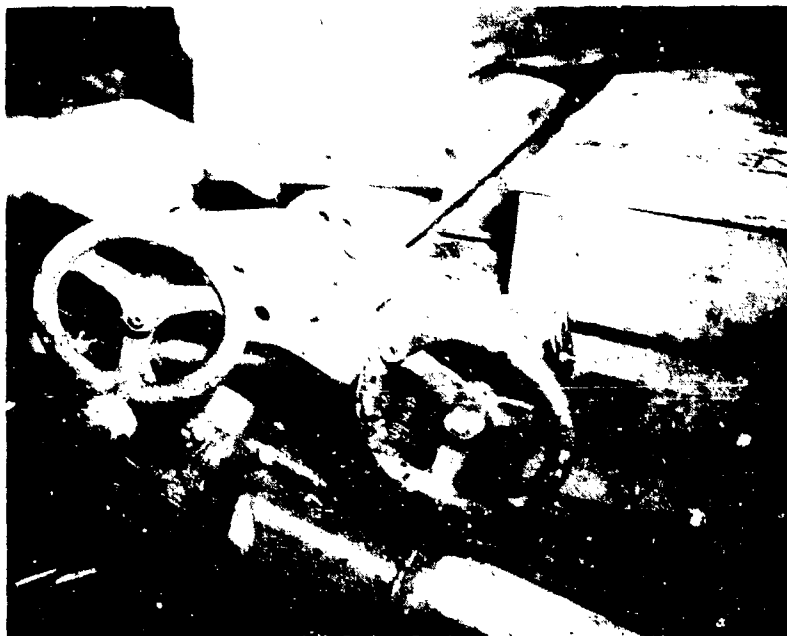


Fig. 104 - USS Nevada - Launcher, Rocket, 4.5", T66E2 -
Detail of failure to elevating and traversing
mechanism bracket.

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Fig. 105 - USS Nevada - Launcher, Rocket, 4.5", T56E2 -
Right front view after Test Able.

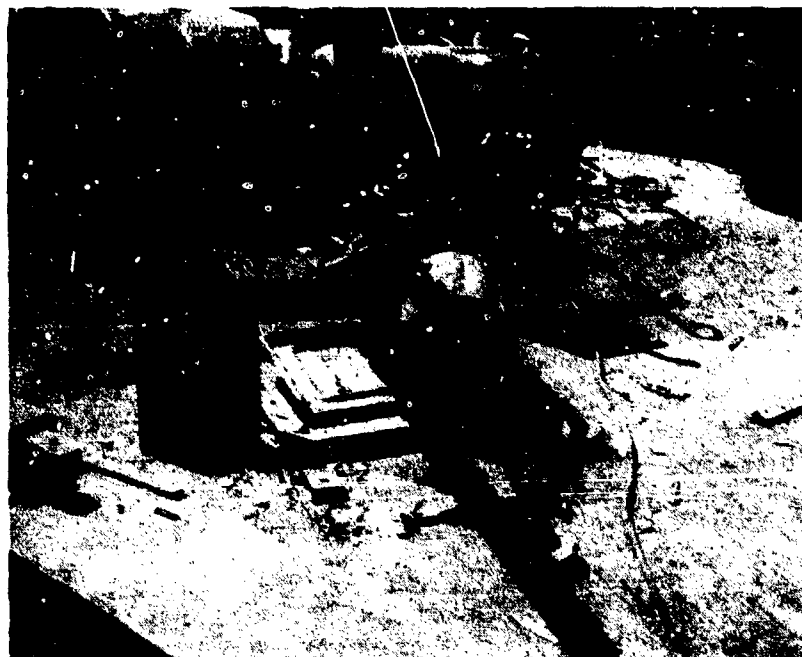


Fig. 106 - USS Nevada - Mortar, 81mm, M1 - Position as
found after Test Able.

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b. The Mortar displayed on the USS Nevada was not masked. Damage consisted of a sharp bend in the fit where the elevating shaft is attached to the yoke and was caused by secondary damage when a can of rations weighing approximately 25 lbs. struck the side of the mortar tube, see Fig. 106. The force was sufficient to cause a break in the weld which attached the spade point of the right leg to the deck pad, which in turn was secured to the deck. The preservative in the tube was intact and in good condition except for a very small area at the muzzle end which was exposed to the direct rays of the bomb blast. In this area the grease had been dried away. Heat damaged the collimating sight of the Sight, M4, beyond repair.

B. TANK AND AUTOMOTIVE

1. Car, Armored, Light, M8, (Item 55). This item was damaged only aboard the USS Arkansas and that was of a minor nature. The damage was limited to those sheet metal surfaces which presented a relatively large area upon which the blast could act. The left front fender was blown toward the tire and downward by the blast, tearing the metal along a straight line, where it overlapped the armored hull. This displacement caused the left front fender to bulge outward. The left rear fender was warped in by the blast as was the right rear fender. In the latter case the blast was evidently deflected by Turret No. 3. Three of the four fender box covers were blown open, either slipping the hasp or tearing it free. In those cases in which the hasp held temporarily, the cover was curled at the corners and along the edges. The right rear fender box cover was the only one not affected. A box for the windshields, attached just below the hatches on the hull front, was slightly distorted by the blast. Both front hatch covers were blown open either by the return rush of air, or by the blast entering the top of the turret and forcing the covers out and forward by the explosion. The canvas turret cover was badly torn and found lying on the turret floor, slightly scorched on the exposed surface. The towing cable was blown from its mounting on the hull to the rear of, and away from, the vehicle but was not lost because it was held by the rear pintle hook. The porcelain insulator at the base of the aerial was chipped on the side facing the blast. All sections of the aerial were carried away. This item was unmasked and showed evidences of scorching.

a. Gun, 37mm M6, assembled to Car, Armored, Light, M8. The Armored Car on which the 37mm Gun, M6, was installed on the USS Arkansas was unmasked. The gun tube was pointing approximately 40 degrees away from the blast. All preservatives with the exception of approximately one inch in the muzzle end were unchanged. In the one inch referred

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to the preservative was dried away. Upon examination, the gun and mounting was observed to have a side play of approximately 4 degrees. The malfunction was traced to the jacking screws on either side of the forward end of the mounting which were no longer bearing against the interior of the shield. It is deemed probable that severe whipping of the tube may have caused deformation of the lugs on the mounting, thus accounting for the clearance in the jacking screws. Retightening of the screws would result in proper rigidity of the mounting in relation to the shield. The elevating worm had been cammed away from engagement with the elevating rack, allowing free elevation of the gun. The disengagement can also be traced to the severe whipping of the gun tube. Traversing of the turret felt slightly gritty but the same condition was observed before the test and is therefore discounted as a result of the test. With minor adjustments mentioned above, the 37mm gun was ready for combat. Of the three 37mm guns M6 displayed on the USS Nevada, USS Pennsylvania, and the USS Saratoga respectively, only the one on the USS Pennsylvania was masked and, but for minor scorching of paint on the USS Nevada display, no damage to the materiel was evident. On the USS Arkansas, the objective window of the Telescope, M70D, was covered with a heavy, sooty film and was chipped at the edges. Two minor spots were found in the recticle. When cleaned, the instrument was in serviceable condition. Rust had formed on the mounting rings on both the USS Arkansas and USS Nevada.

b. Browning Machine Gun, cal..50, M2, Heavy Barrel. This gun, on the USS Arkansas stowed in the antiaircraft position, was found about 20 feet away on the deck. Altho the backplate was off no trouble was experienced with replacing it, but on disassembly it was found necessary to force the oil buffer housing and the bolt to remove them from the gun. On reassembly, the bolt did not ride freely in its ways and the bolt stud could not be inserted because the bolt was too high relative to the slot in the receiver. All this was due to a deformation of the side plates which was apparent to the eye. The barrel supporting bearing was either out of round, or had shrunk as it was difficult to remove and impossible to reinsert the barrel. The gun presented a shiny appearance on the outside surface not usually associated with phosphate finishes. A Metallurgical check will be necessary to determine whether the surface structure has been altered by heat. This gun was completely inoperative.

c. There was no damage to any of the other armored cars in the test.

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2. Carriage, Gun Motor, M-16, (item 56). Only superficial damage was sustained by this item. Aboard the USS Arkansas this vehicle was unmasked and located in the area that received the most blast. The paint on all surfaces directly exposed was discolored from reddish brown to black and a blistering of the paint in these discolored areas was noticed. At the rear of the body, the right storage box was flattened against the body. The left box was torn free on the right side and forced to the left, crushing it slightly. The armor on the right side was bowed in six inches at its top opposite the multiple gun mount, causing the gas tank shield in the fighting compartment to be forced upward and crushing the gas tank slightly. The right door was just jammed inside the body along the unhinged side. The left door was blown open with enough force to bend the upper hinge, making it impossible to close this door without forcing. The right side of the hood was partially opened at the side plate and both catches were broken. The right front fender was bent approximately at the middle almost touching the tire and was torn loose at the running board, see Fig. 107. The windshield was broken and the windshield armor blown open on its hinges until it was pointing straight upward. The left vision slit cover (driver's) was blown from its slot and found on the drivers seat. The instrument panel and unbroken instrument windows were blackened. Only the glass covering the Tachometer was broken.

a. Multiple Cal. .50 Machine Gun Mount, M45. This mount on the USS Arkansas was scorched generally on its right side but the paint was still intact. Such preservative as was left on the elevating sector and turret ring gear was removed by the heat of the bomb burst and these parts were dry. After Able Day the only rust detected after several days exposure was on the sight support group and on the elevating sector gears. The front protective armor was hanging loose because its left retaining bolt had sheared. The dimmer switch assembly on the Mk IX reflector sight was blown loose from the reflex element and was left hanging by its lead wire. The base of the switch was broken, making it impossible to turn on the lighting system. The rest of the sighting system appeared undamaged. A hole was torn in the bottom of the gasoline tank on the generator because of twisting of the outlet pipe. This hole was so jagged and irregular as to make it impractical to repair the tank. Prior to the test the mount was operated with a single 12-volt tank-type battery instead of the two conventional 6-volt units. This was left on the mount without clamps and was found on its side in the bed of the vehicle. The two trunnion covers were dished inward as much as 1/2" at the center although the trunnions themselves were unaltered. The lower inspection doors were blown outward. The four ammunition chest holding brackets were bent forward and all four ammunition chests were broken beyond repair, the covers being parted from

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Fig. 107 - USS Arkansas - Carriage, Motor, Multiple Gun, M16 - Condition after Test Able.



Fig. 108 - USS Arkansas - Mount, Machine Gun, Multiple, Cal..50, M45 - Condition after Test Able.

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the rest of the chest at the hinges. These chests were scattered for approximately 20 feet in front of the vehicle. The spare chests stowed in the body of the half-track were unharmed except for a scorching of the paint on the upper side. New batteries were installed and the mount operated in elevation and traverse. The firing solenoids were scorched but were operative. The condition of the mount may be seen in Fig. 108. The four Browning Machine Guns presented a very rusty appearance after only short exposure. This rust was not consistent over the whole surface but was spotty. It was very apparent on the barrel supporting bearing and on the top of the receiver. The side plates on the lower left gun were sprung slightly so that the oil buffer body had to be removed by force. The upper left hand gun functioned satisfactorily and disassembled easily. Neither of the guns on the right hand side of the mount would charge while still assembled and before removal. This may be foreign matter in the mechanism since cleaning revealed them to be in serviceable condition. They reassembled and functioned easily. All four guns presented a shiny appearance on the outside surfaces unlike phosphate finishes. A metallurgical check will be necessary to determine whether the metallic structure has been altered by heat.

b. The damage to this item on the USS Nevada was confined to the front part of the vehicle. The front axle and housing were bent on the left side. The left front shock absorber connecting rod was bent. The right windshield was broken by pressure and the speedometer glass broken. The vehicle was operable. The M45 Multiple Machine Gun Mount was only superficially damaged. The dimmer switch assembly was torn loose from the reflex element of the Mk IX reflector sight (Navy) and was left hanging by its lead wire. This switch was inoperative. The light filter located on the front of the instrument was cracked and the reticle reflecting glass was shattered, although its housing was still intact. The battery voltage meter was also shattered. The battery cables were burned through in several places and some of the insulation was gone. Both trunnion covers were dished inward about 1/2" in the middle. The thicker trunnions were unaltered. The gasoline tank and generator flywheel casing were dented as if struck by some small missile. The ammunition chest holding brackets were bent forward and all four chests were damaged. They were scattered as shown in Fig. 109. The covers were torn from the boxes at the hinges. The chest for the lower left gun was still attached to the bracket although the cover was lost as shown in Fig. 110. The chests stowed in the vehicle were unhurt. The generator was started and the mount operated in elevation and azimuth. The solenoids were operative and the guns were undamaged and in place. No damage to these mounts was noted on the USS Pennsylvania and the USS Saratoga.

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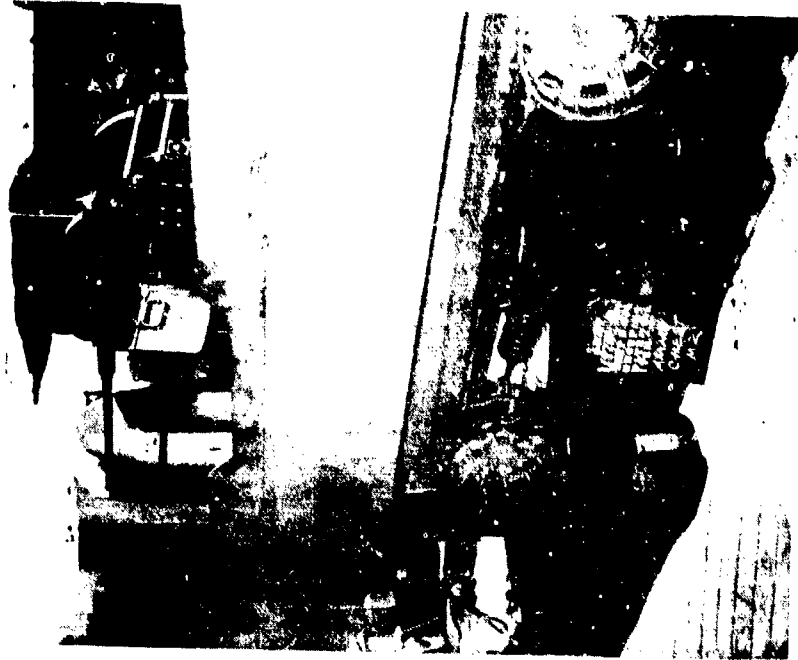


Fig. 110 - USS Nevada - View showing broken ammunition chests, M2.



Fig. 109 - USS Nevada - Mount, Machine Gun, Multiple, Cal..50, M45 - View showing dispersion of damaged ammunition chests.

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3. Carriage, Gun Motor, 90mm, M36. (Item 57), equipped with the following fire control items;

	<u>Ark</u>	<u>Nev</u>	<u>Penn</u>	<u>Sara</u>
Mount, Telescope, M64		X		
Mount, Telescope, T92	X		X	X
Mount, Telescope, T104E1	X	X	X	X
Periscope, M6 (six)	X	X	X	X
Quadrant, Elevation, M9	X	X	X	X
Quadrant, Gunners, M1, (Item 41)	X	X	X	X
Telescope, M76F (Item 40)	X	X	X	X
Telescope, Panoramic, M12	X	X	X	X

The ship's starboard anti-aircraft partially shielded this vehicle aboard the USS Arkansas. The paint on the right side was discolored reddish brown and black. This was only a surface discoloration since a light scraping uncovered the original color. The right fender was blown upward and torn loose across the hinges by the blast, the assistant driver's hatch cover was found open. The driver's cover had apparently been blown open and then fallen back into position with the latch outward preventing the hatch from closing, see Fig. 111. The lower periscope head at the driver's seat had fallen from its mounting and was found unbroken slightly ahead of the driver's seat. The upper section of the aerial was broken off, twisted and driven into the wood deck, three feet ahead of the right track. The lower section of the mast, held at the base but twisted under the open hatch on that side. The outer and right turret covers were torn loose and carried away, the two 3" hinges on each was torn loose at the weld. The left lid was blown open and was laying forward on the immovable part of the turret cover. The gun in the turret was elevated and traversed, no malfunction was evident.

a. The Cal..50 Browning Machine Gun carried in the anti-aircraft position on this Gun Motor Carriage was lifted with its cradle and deposited on top of No. 1 gun turret. An idea of the distance the gun was carried may be seen in Fig. 112. The pintle from which the gun came may be seen at the upper right, see arrow, while the gun itself is being pointed to. The gun was undamaged except for a burr on the muzzle end of the barrel. The tripod usually stowed on this vehicle was parted from its remaining straps and struck the side of the same gun turret. The right leg was dented and both leg locks were bent. There was also a definite gouge in the pintle hole.

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Fig. 111 - USS Arkansas - Carriage, Motor, 90mm Gun M36 -
View after Test Able.

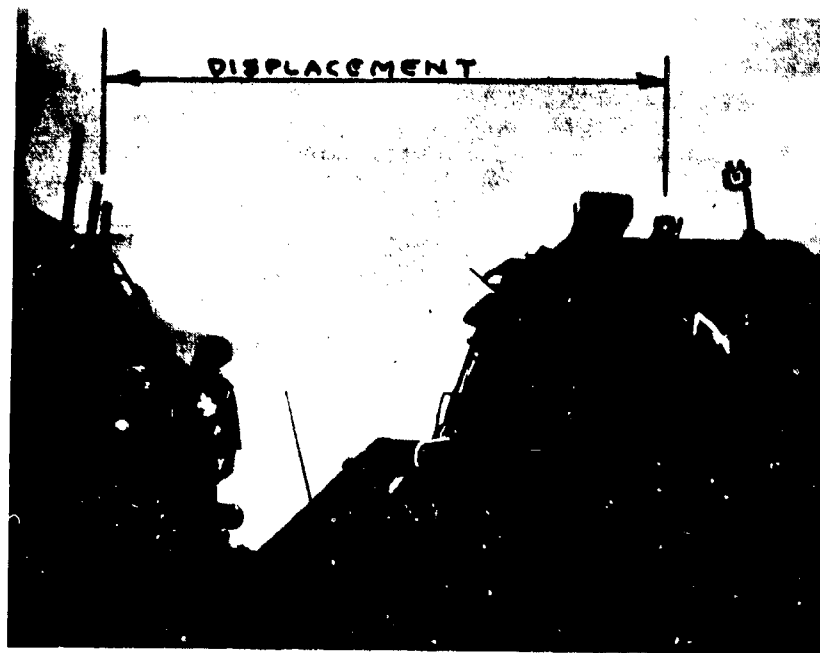


Fig. 112 - USS Arkansas - Carriage, Motor, 90mm Gun, M36 -
View showing dislocation of Browning machine gun
from mount on vehicle turret. Note arrow.

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b. Aboard the USS Nevada, the left front fender was torn loose at the hinge similar to that aboard the USS Arkansas, see Fig. 113. The turret cover lids were torn loose, see Fig. 114, as on the USS Arkansas and the braces torn loose, see Fig. 115 and Fig. 116. The driver's hatch had blown open and in falling back was caught by the periscope head, see Fig. 113. The turret splinter shields on the right and right front were forced upward, see Fig. 115. The oil bath air cleaner hoses in the engine compartment were collapsed by pressure, see Fig. 117. A slight scorching was evident and the turret elevated and traversed satisfactorily. The Cal..50 Browning Machine Gun on this Gun Motor Carriage was struck by some falling debris on the barrel supporting bearing in such a way as to make it impossible to retract the firing mechanism freely. After removing the barrel, the gun mechanism functioned satisfactorily. One of the holding pawl springs was lost and the hood on the front sight was bent as if hit by some small object.

4. Carrier, Cargo, M29C (Item 58). This vehicle aboard the USS Arkansas was partially shielded at the rear by the shop truck and at the right by turret No. 5. The hull was severely damaged by blast and pressure. The stern cell was crushed, but in this case, by blast only, see Fig. 118. The deck of the bow cell was discolored from reddish brown to black. The bow cell lid was pushed down into its opening on the unhinged side. The surf guard was discolored on the side toward the blast and was pushed down so that its left side rested below the vehicle's deck level instead of on the deck in its normal position. The left track apron was bulged outward where it was not held by the hinges or apron catches. The hull floor pan in the cargo compartment floor was pushed down until it rested on the control rods located beneath it, see Fig. 119. The windshield was broken, scattering glass in the direction from which the blast came as well as in the opposite direction. The engine compartment lid was found beside the shop truck, fifteen feet to the rear of the vehicle, and in the direction from which the blast came. The instrument panel was pushed inward toward the engine, see Fig. 120, striking the distributor cap and breaking it. The instruments were undamaged. The rudder tie bar was bowed in the middle, see Fig. 118, and bent 90 degrees on the threaded section at the end of the bar.

a. The situation aboard the USS Nevada was very similar except the vehicle was completely masked. The hull was badly damaged by blast and pressure. The stern cell was crushed by blast, see Fig. 121. The bow cell was similarly crushed but to a lesser degree, and the surf guard was pushed down in the center, below the vehicle's deck level, see Fig. 122. The hull floor pan in the cargo compartment

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Fig. 113 - USS Nevada - Carriage, Motor, 90mm Gun, M36 - Condition after Test Able.



Fig. 114 - USS Nevada - Carriage, Motor, 90mm Gun, M36 - View showing hinged cover torn from turret.

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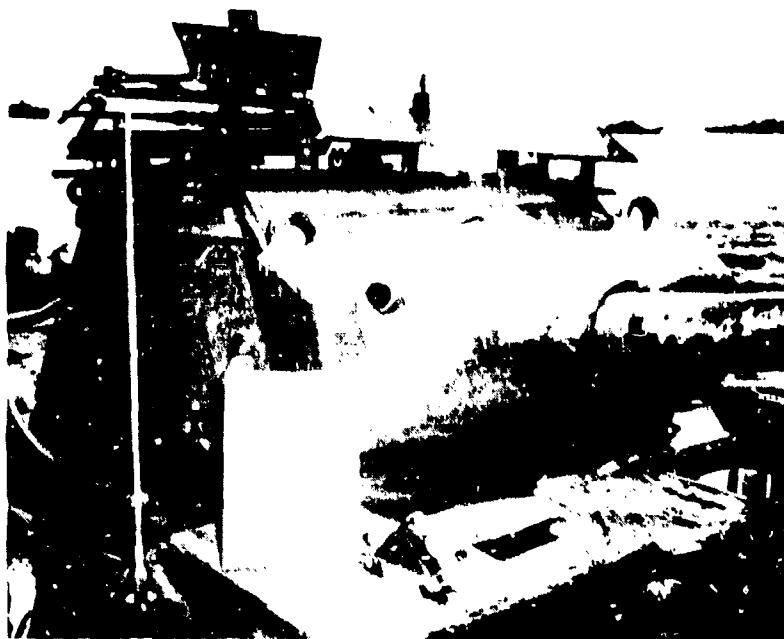


Fig. 115 - USS Nevada - Carriage, Motor, 90mm Gun,
M36 - Condition after Test Able.



Fig. 116 - USS Nevada - Carriage, Motor, 90mm Gun,
M36 - Condition after Test Able.

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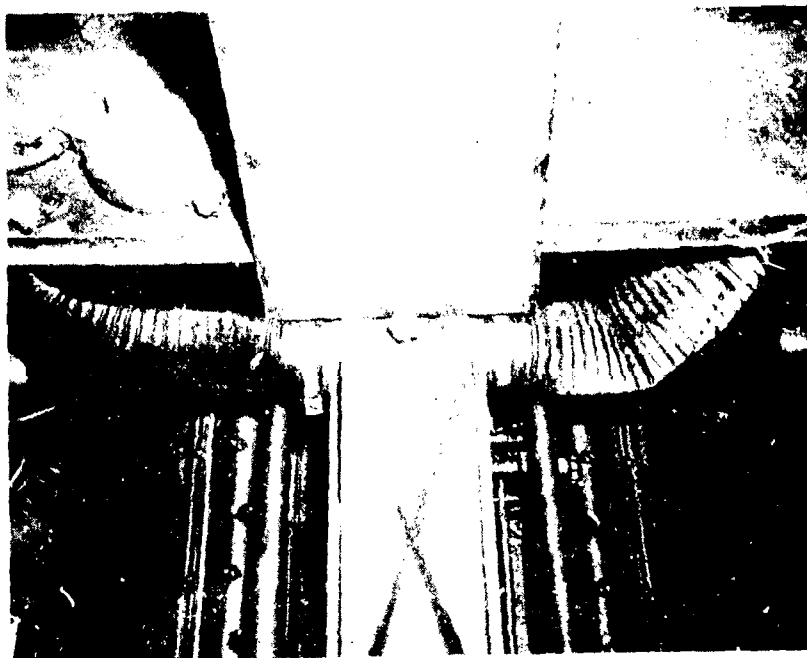


Fig. 117 - USS Nevada - Carriage, Motor, 90mm Gun, M36 - View after Test Able showing damage to engine air cleaner hoses.

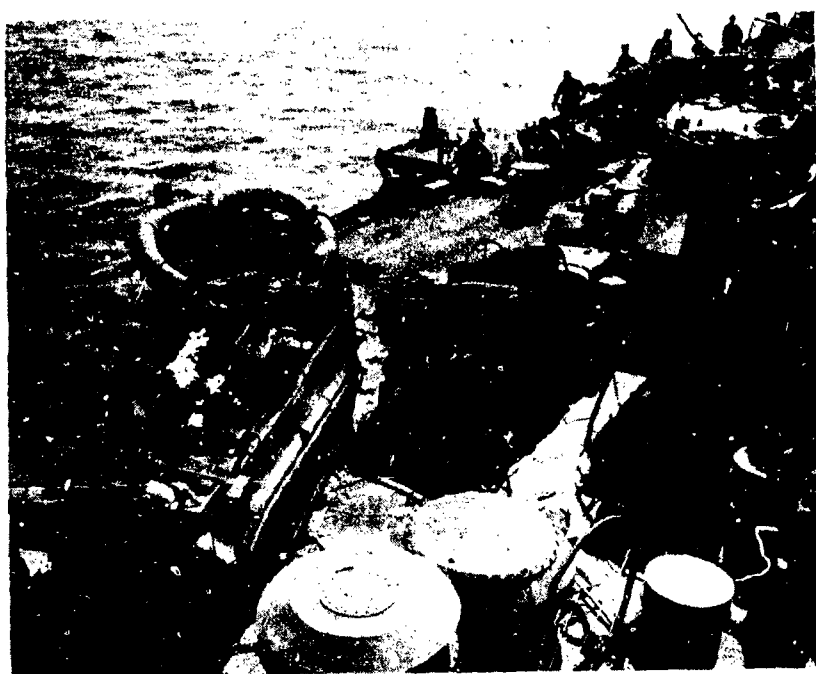


Fig. 118 - USS Arkansas - Carrier, Cargo, M29C and Truck, 1/4 Ton, 4x4 - General view after Test Able.

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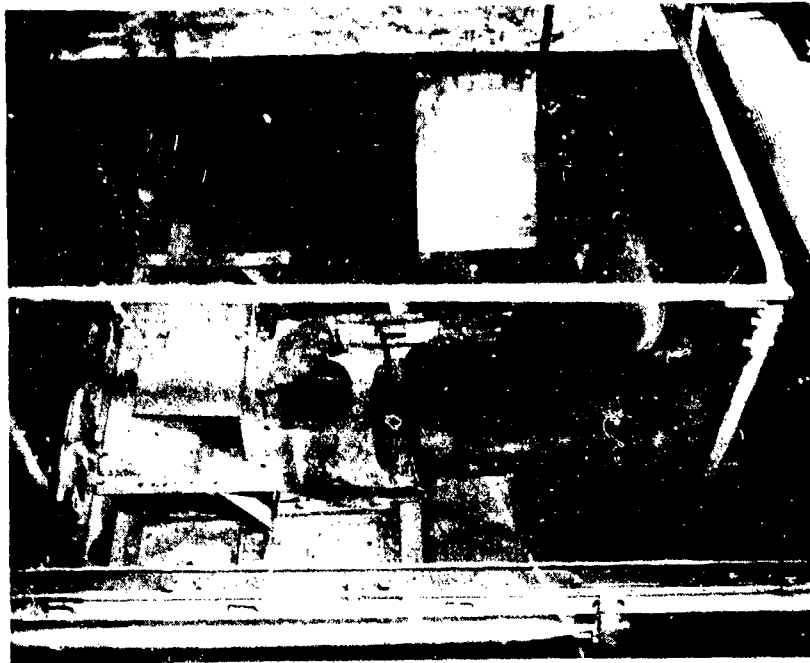


Fig. 119 - USS Nevada - Carrier, Cargo, M29C - Cargo compartment after Test Able.



Fig. 120 - USS Nevada - Carrier, Cargo, M29C - Damage from Test Able.

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Fig. 121 - USS Nevada - Carrier, Cargo, M29C - View after Test Able.



Fig. 122 - USS Nevada - Carrier, Cargo, M29C - View after Test Able.

131
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floor was pushed down until it rested on the control rods located beneath it, see Fig. 119. The windshield was broken. The engine compartment lid was bent and blown into the drivers compartment, see Fig. 122. The instrument panel was forced in towards the engine, crushing the distributor and bending the air cleaner. The rudder tie bar was bowed in the middle and bent 90 degrees on the threaded sections at the end of the bar.

b. Similarly, aboard the USS Pennsylvania, the rear buoyancy cell was crushed by blast and pressure, the left hand windshield was cracked and the hull floor pan, in the floor of the cargo compartment, was forced downward but was not resting on the control rods. The vehicle was ready for immediate service. There was no damage to this item aboard the USS Saratoga.

5. Tank, Heavy, M26 (Item 59), equipped with the following Fire Control items:

	Ark.	Nev.	Penn.	Sara.
Mount, Periscope, T113	X	X	X	X
Mount, Telescope, T90	X	X	X	X
Periscope, M4A1 (Two)				
(Item 39)			X	X
Periscope, M6 (Nine)	X	X	X	X
Periscope, M10F (Item 39a)	X	X	X	
Quadrant, Elevation, M9	X	X	X	X
Telescope, M71C	X	X	X	X
Telescope, M76F	X	X	X	X

This item, aboard the USS Arkansas, was completely shielded by turrets 1 and 2 and the superstructure. The damage caused was of a minor nature and the tank was in operating condition. The left rear sponson was thrown open with sufficient force to drive the rear handle into the cover. The mantlet cover over the gun shield was torn, shredded, and scorched by the high winds and heat peculiar to this bomb. This same condition was prevalent on the two canvas covers, for the drivers and assistant driver's hoods, which were strapped to the right side of the turret, see Fig. 123. An inspection cover at the rear of the fighting compartment was forced into the fighting compartment by pulling the securing pins through their sheet metal fastenings. A slight scorching was evident on the turret and the 90mm M3, gun. The turret elevated and traversed satisfactorily.

a. Aboard the USS Nevada, the paint was burned off the top rear portion of the tank and the sand shields were bent slightly outward by the blast. The floor boards of the fighting compartments were blown out of place, see Fig. 124

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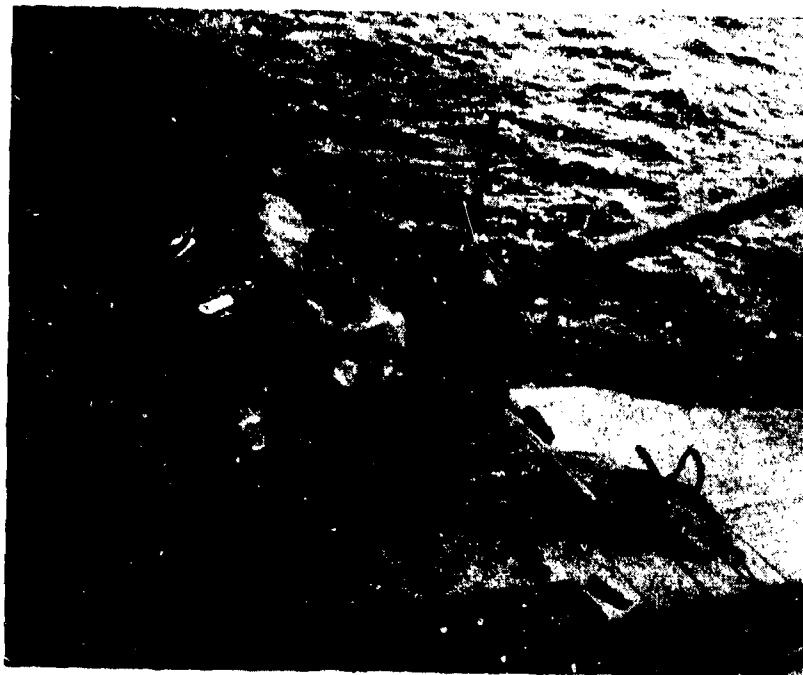


Fig. 123 - USS Arkansas - Tank, Heavy, M26 - View after Test Able.

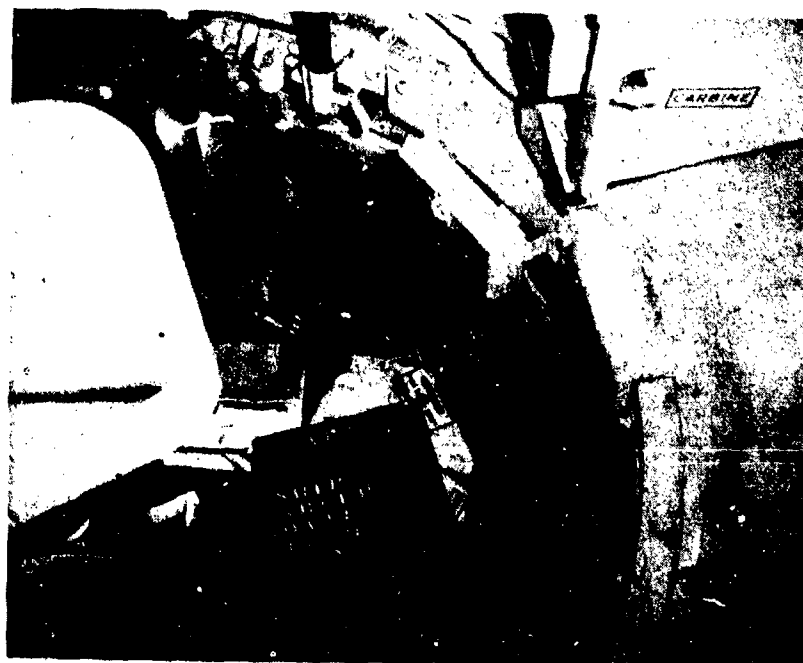


Fig. 124 - USS Nevada - Tank, Heavy, M26 - View inside turret showing displacement of engine inspection door and floor plates.

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and Fig. 125. One of them struck the driver's seat with sufficient force to break the right leg. An inspection cover, bent double, was forced into the fighting compartment by pulling the securing pins through their sheet metal fastenings. The turret was traversed and elevated with no malfunctions evident. The cal..30 bow machine gun was struck by falling debris and the barrel jacket bent rendering it unserviceable. The mechanism operates without the barrel. The other machine guns on this tank were undamaged.

b. Only slight damage was sustained by this item aboard the USS Pennsylvania. The driver's hood covers were slightly scorched. The pressure caused the inspection cover at the rear of the vehicle to bulge in toward the fighting compartment but it was not torn loose. The 20mm M3 gun was unharmed except for a slight scorching. No damage was sustained aboard the USS Saratoga.

6. Tank, Light, M24, (Item 60), equipped with the following fire control items:

	<u>Ark.</u>	<u>Rev.</u>	<u>Penn</u>	<u>Sara.</u>
Mount, Periscope, T107 (Item 35)	X	X	X	X
Mount, Telescope, M65 (Item 37)	X			X
Mount, Telescope, T94		X	X	
Periscope, M4A1 (two)			X	
Periscope, M6 (Five)	X	X		X
Periscope, M10P	X	X		X
Quadrant, Elevation, M9	X	X	X	X
Quadrant, Gunners, M1	X	X	X	X
Telescope, M71K (Item 46)	X	X		X
Telescope, M76G			X	

This item aboard the USS Arkansas, was completely masked and only superficial damage was sustained. The right sand shield was blown outward almost 45 degrees. The left sand shield was blown outward 60 degrees. The periscope housing doors on the assistant driver's hatch and the commander's M10P, periscope were bent and damaged and the canvas covers for the coaxial machine guns were shredded by the blast. There was a slight melting away of the preservative in the tube bore of the 75mm gun, M1, for approximately 1/4" from the muzzle end. The heads were blown from the drivers and assistant drivers periscopes, M6, see Fig. 126. The cupola periscope was pushed down bending the locking screws. The sheet metals covers over the opening when the periscope is not in place, were bent and somewhat twisted. No damage resulted on the other ships.

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Fig. 125 - USS Nevada - Tank, Heavy, M26 - View
inside turret showing displacement of engine
inspection door and floor plates.

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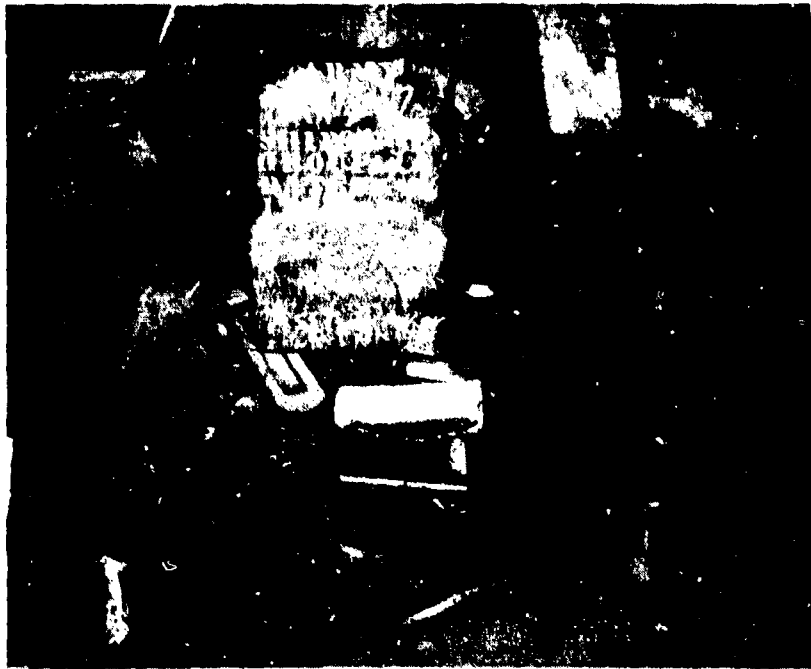


Fig. 126 - USS Arkansas - Periscope, M6 on Tank, Light, M24 - View showing damaged cover and the periscope head blown from the assistant driver's hatch cover.

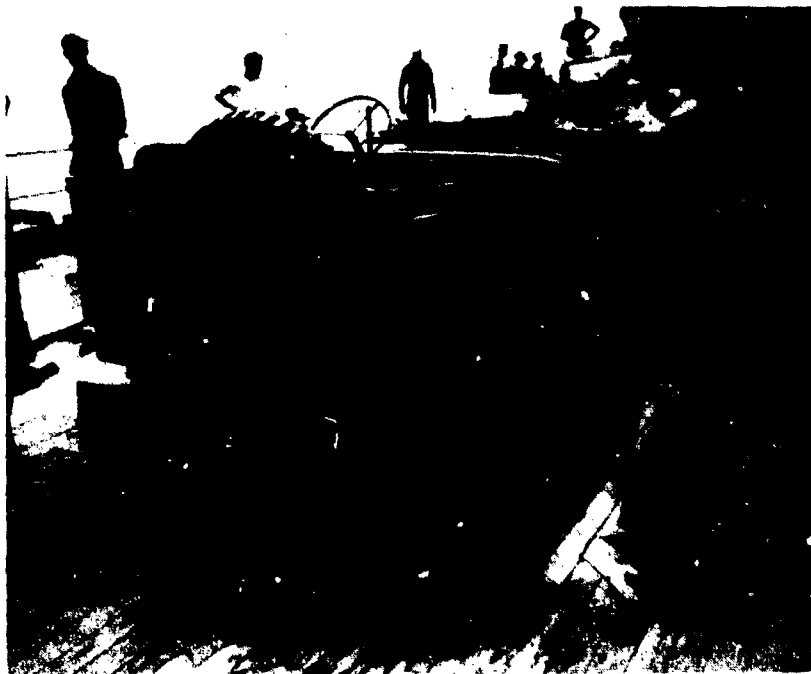


Fig. 127 - USS Arkansas - Truck, 1/4 Ton, 4x4 - View of lashings to right rear safety chain eye before Test Able.

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a. The light Tank M-24 aboard the USS Nevada was not damaged except that the engine inspection cover was blown into the fighting compartment. For approximately 1/4" from the muzzle end the preservative in the tube bore of the 75mm M1 gun was melted away.

b. Aboard the USS Pennsylvania the engine inspection cover was blown into the fighting compartment. A slight scorching of paint was noticed on the hull and the muzzle end of the 75mm M1 gun. No damage was sustained aboard the USS Saratoga.

7. Truck, 1/4 Ton, 4x4, (Item 61). This item, completely masked aboard the USS Arkansas, was fastened to the deck by a turnbuckle through the right safety chain eye, see Fig. 127. The blast coming in at the rear of the vehicle forced the rear of the body upward, tore it loose from the frame, and bulged the rear floor upward, tearing the body bolts through the sheet metal brackets holding it to the frame. This action caused the rear member of the frame to bend upwards 30 degrees on the left of the pintle and 45 degrees on the right before the body and frame were separated, see Fig. 73. The left side of the body to the rear of the driver's seat was bulged out due to the vehicle being forced to the left against a ventilator and bending the body, just ahead of the driver's seat inward approximately four inches. The front seats were bent forward in the direction the blast was traveling and the rear seat was deposited on the assistant's drivers seat, see Fig. 128. The gasoline tank was slightly crushed by pressure at the top and front sides. The left front fender and hood were secondarily damaged by falling debris, see Fig. 128. The blackout driving light and fender received the greatest damage, the hood very little. The fender was bent downward, almost touching the tire, and the light and light guard were smashed downward and to the left. Except for displacement, the light was undamaged. The left front wheel was forced against the deck lashing at the bottom, thereby forcing the top outward. There was no apparent damage to the axle. The rear shock absorbers were stretched to their maximum limits because the frame was bent upward while the wheels remained on the deck, see Fig. 129. The rear spring U-bolts were opened by the twisting motion exerted when the frame was lifted. The hydraulic brake lines attached to the body and axle were bent by the separation of the frame and wheels but appeared in serviceable condition.

a. The vehicle aboard the USS Nevada suffered only slight damage. The hood was bent and twisted, see Fig. 130. The left front fender was bent upwards and left front spring was bent at the front shackle due to the lashings holding it to the deck. The windshield was pulled from its hinges and thrown to the deck 10 feet in front of the vehicle, see Fig. 131. The gas tank was torn loose from its floor brackets

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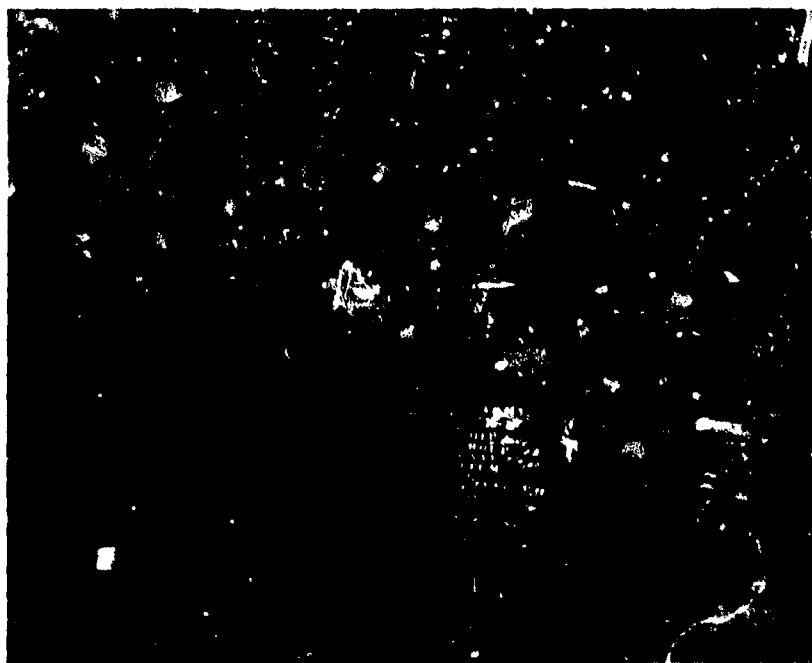


Fig. 128 - USS Arkansas - Truck, 1/4 Ton, 4x4 - View showing general damage to left side of vehicle.



Fig. 129 - USS Arkansas - Truck, 1/4 Ton, 4x4 - View showing damage to rear of vehicle because of lashings.

138
SECRET

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Fig. 130 - USS Nevada - Truck, 1/4 Ton, 4x4 - General view of damage after Test Able.

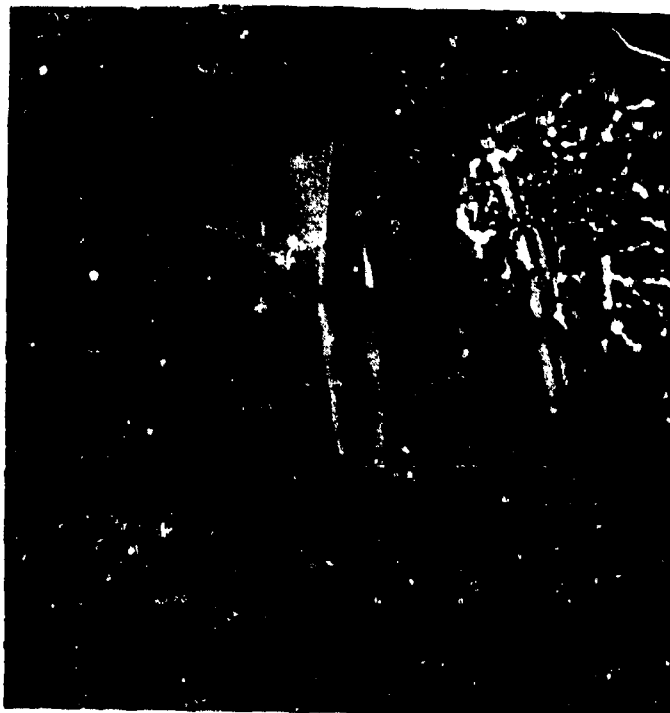


Fig. 131 - USS Nevada - Windshield blown from Truck, 1/4 Ton, 4x4.

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and crushed by pressure. No damage occurred to this item aboard the USS Pennsylvania and the USS Saratoga.

8. Truck, 3 1/2 Ton, 6x6, Amphibian (Item 62). This vehicle aboard the USS Arkansas was badly damaged. The blast of the bomb came down on the engine hatch cover tearing it away, flattening the bow bulge and simultaneously lifting the vehicle. The vehicle was secured by cables at the forward lifting eyes, see Fig. 132, distorting the hull upward as a result, see Fig. 133. The left and right sides of the cargo compartments were bowed to the vehicle's right, see Fig. 134. The engine hatch cover was found eight feet ahead of the vehicle in the direction of the blast. One hole found in the cargo compartment hold was caused by secondary damage. The driver's compartment was a tangled mass of wreckage; the cowl and instrument panel were pushed backward, demolishing all the instruments. The windshield wipers and the front and side frames of the windshield were blown over no. 6 turret (11 feet high and 15 feet wide) and deposited in the 1/4 ton 4x4 truck on the opposite side of the ship. The radiator fan shroud and upper radiator water tank were slightly crushed, see Fig. 135. The cylinder head water outlet was broken away at the cylinder head and the radiator inlet pipe and hose were damaged. The carburetor air cleaner had been crushed and the carburetor broken at the intake manifold connection. The cargo compartment floor was completely destroyed, see Fig. 136. The rear deck was bulged slightly and the hatch forced open breaking the lock eye. The left side of the front bulkhead was crushed inward, the spare lamps and drain plugs remained in place, while the right side of the same bulkhead was shattered by the blast, scattering tools throughout the engine compartment. The rear cargo compartment was bulged out towards the rear of the vehicle. The sector shaft was bent downward at the pittman arm. The steering wheel was broken by the dashboard and the steering column bent to the right.

a. Aboard the USS Nevada a similar condition existed. The frame was badly sprung and broken at the rear of the front wheel. The bow was pushed up, crushed, and folded slightly backward. This was caused by the blast as well as the lashings, see Fig. 137, Fig. 74, Fig. 138 and Fig. 139. The engine hatch cover was torn off by the blast and blown overboard, see Fig. 140. The radiator supports were badly bent and the radiator was smashed and burst. The windshield had been torn loose from its hinge pins and blown over the side. The carburetor had broken off at the base as had the water pump. The chassis and power train were sprung badly and the fuel tank crushed by the pressure. The rear axle housing was badly bent by the blast. The engine was badly damaged and the front wheels sprung. The water pump was broken. The wiring pulled loose and scorched, the generator cracked, the air cleaner and oil filter smashed and the crankcase was cracked.

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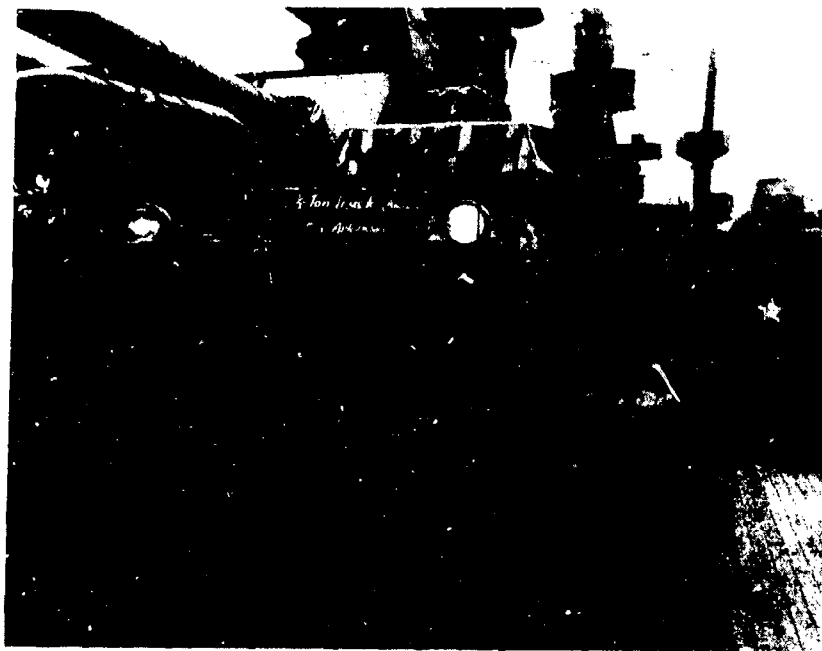


Fig. 132 - USS Arkansas - Truck, 2 1/2 Ton, 6x6, Amphibian -
Method of lashing to deck.

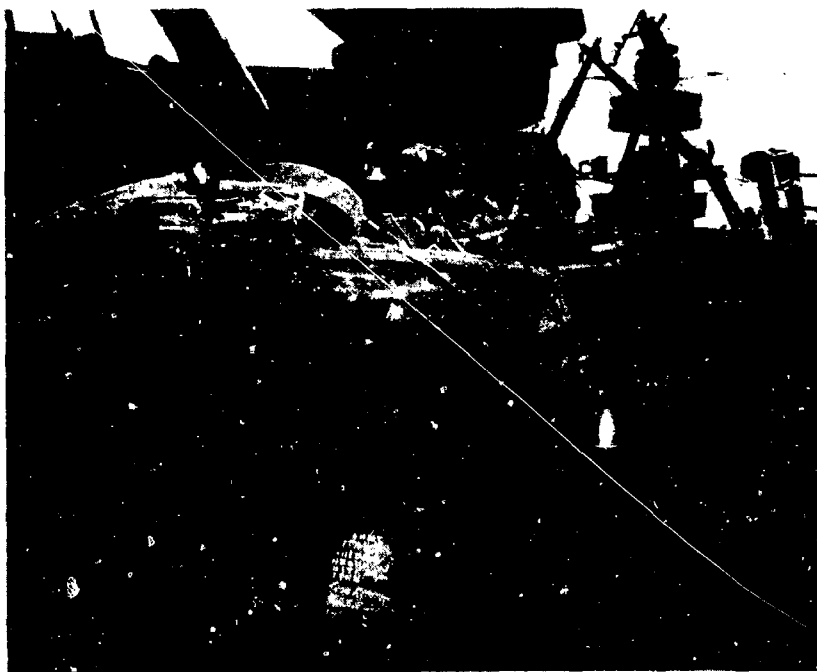


Fig. 133 - USS Arkansas - Truck, 2 1/2 Ton, 6x6,
Amphibian - Showing damage caused by lashings.

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Fig. 134 - USS Arkansas - General view after Test Able, showing Carriage, Motor, Multiple, Gun, M16 and Truck, 2 1/2 Ton, 6x6, Amphibian.



Fig. 135 - USS Arkansas - Truck, 2 1/2 Ton, 6x6, Amphibian - View of engine compartment after Test Able.

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Fig. 136 - USS Arkansas - Truck, 2 1/2 Ton, 6x6, Amphibian - View showing condition of cargo compartment after Test Able.



Fig. 137 - USS Nevada - Truck, 2 1/2 Ton, 6x6, Amphibian - General view showing lashings.

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Fig. 138 - USS Nevada - Truck, 2 1/2 Ton, 6x6, Amphibian -
View showing damage to bow surf board.



Fig. 139 - USS Nevada - Truck, 2 1/2 Ton, 6x6,
Amphibian - View showing damage caused
by lashings.

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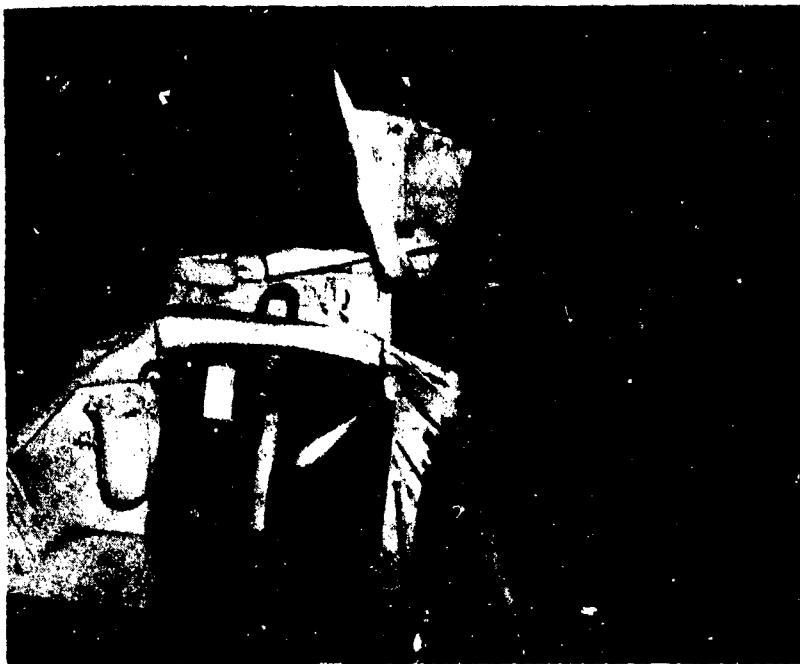


Fig. 140 - USS Nevada - Truck, 2 1/2 Ton. 6x6, Amphibian -
Bow and engine compartment after Test Able.

145
SECRET

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b. Aboard the USS Pennsylvania, the floor boards in the cargo compartment, and the tools in engine compartment, were displaced by the blast and the windshield was blown upright from a folded position. There was no damage to this vehicle aboard the USS Saratoga.

9. Truck, Automotive Repair, 2 1/2 Ton, 6x6, (Item 63). This vehicle on the USS Arkansas was unshielded. The blast caught the vehicle on the left front side tearing the radiator loose from its mountings, tearing and forcing upwards the left frame and fender and carrying away the hood, see Fig. 141, Fig. 142 and Fig. 75. The cab was pushed over to the right side, torn loose, where it joins the lower section, and pivoted, at the top of the windshield, over the engine, see Fig. 142 and Fig. 143. The rear lower section of the cab was pushed forward, toward the blast, crushing and demolishing the seat, see Fig. 142. The top of the ST-6 body, from the lower part of the windows up, was carried away, see Fig. 141 and Fig. 142. The front panel, on which the heater and control boxes are located, was carried away with the blast for a distance of 100 feet. Some uprights between the windows were carried away with the blast. Those remaining were bent to the rear and right, away from the blast. The top right rear panel and door were missing. The top left panel and door were still in place, see Fig. 144. They were relatively undamaged but were bent in toward the center of the vehicle making it impossible to close the door. The body was bent downward at the right rear corner, causing a bend between the Fordaire cover and the bench on the right side. The right side of the frame members over the intermediate and rear most axle, at the overload bumpers, were bent downward approximately four inches giving the appearance of a broken spring, see Fig. 145. The left door and door post had been pushed in against the steering wheel, breaking it and bending the steering column. Except for a crushed air cleaner, bent fan and holes in the radiator, there was no damage to the engine. The engine supports to the Fordaire unit were broken at the bolt holes permitting the unit to move to the rear six inches, see Fig. 146. This pulled the lower radiator hose free and parted the exhaust pipes at a joint alongside the engine. The right ventilator and panel of the Fordaire unit was torn loose from the body, folded double, and left lying on the deck alongside the vehicle. The gas tank was crumpled inward on the middle, top, and right sides, approximately four inches.

a. On the USS Nevada, the radiator was forced back into the engine causing the fan to break the radiator core. The engine hood was missing, see Fig. 147. The spark plugs were broken and the generator and fuel pumps were bent and twisted. The front axle, fenders, and the running board were badly bent, see Fig. 147 and Fig. 148. Both doors were blown open and bent. The metal floor boards in the cab were

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Fig. 141 - USS Arkansas - Truck, Auto. Repair, 2 1/2 Ton,
6x6, M8A1 - Left front view after Test Able.



Fig. 142 - USS Arkansas - Truck, Auto. Repair, 2 1/2 Ton,
6x6, M8A1 - Top view of cab and engine.

147

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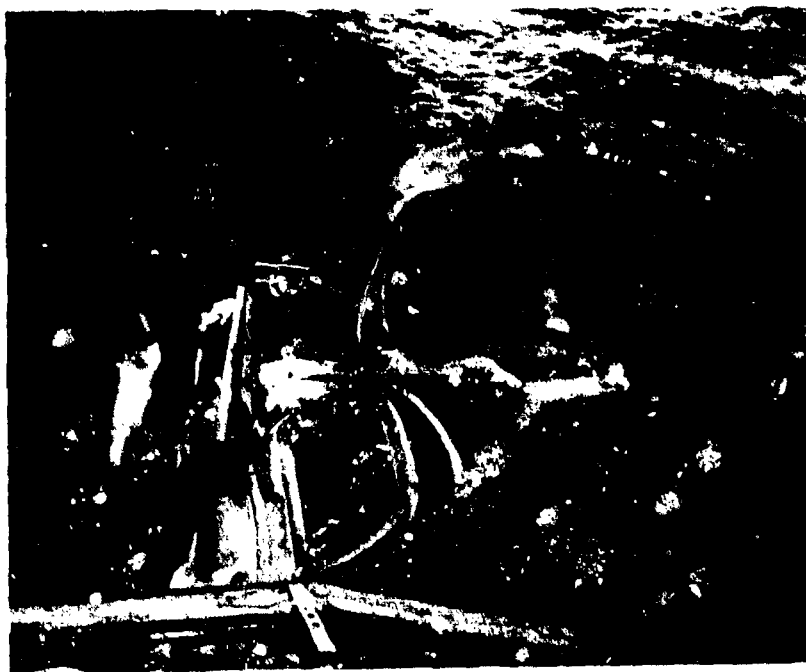


Fig. 143 - USS Arkansas - Truck, Auto. Repair, 2 1/2 Ton,
6x6, M8A1 - Top view of cab and engine,
from rear.

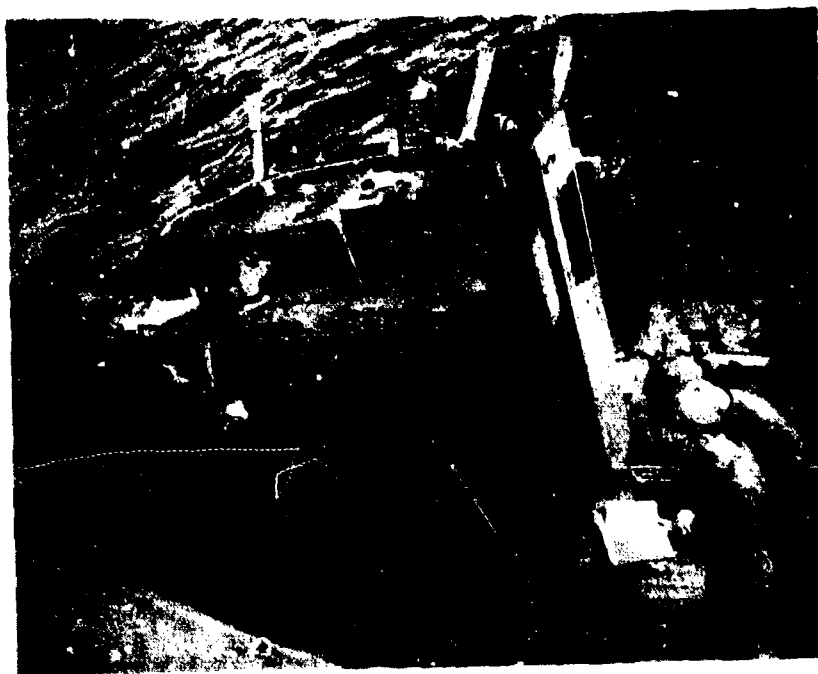


Fig. 144 - USS Arkansas - Truck, Auto. Repair, 2 1/2 Ton,
6x6, M8A1 - Top view of ST6 body.

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Fig. 145 - USS Arkansas - Truck, Auto. Repair, 2 1/2 Ton, 6x6, M8A1 - Right view after Test Able.



Fig. 146 - USS Arkansas - Truck, Auto. Repair, 2 1/2 Ton, 6x6, M8A1 - View showing generator and air compressor.

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Fig. 147 - USS Nevada - Truck, Auto. Repair,
2 1/2 Ton, 6x6, M8A1 - General
view after Test Able.



Fig. 148 - USS Nevada - Truck, Auto. Repair, 2 1/2 Ton,
6x6, M8A1 - Top view of cab and engine.

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pushed upwards about six inches. The dashboard was completely demolished. The frame was sprung and twisted from front to rear. The front spring was bent and all crossmembers were bent and twisted. The front of the truck was pushed backward and the whole body forced backward, downward, and to the left by the blast, see Fig. 149. Both work benches were broken and twisted slightly around the uprights and the top. All tool drawers were broken, bent, and scattered over the floor of the truck, see Fig. 150. The top of the ST-6 body was torn open at the front and along the right side where the sides and top are joined, see Fig. 151 and Fig. 152. The vent screen for the Fordaire unit was torn loose, bent 45 degrees, and left lying on the deck beside the vehicle.

b. On the USS Pennsylvania, the damage was confined to the ST-6 body. The windows in the rear door were blown into the shop truck by the blast and the rear doors were pushed in three inches. The window screens on the right side were blown outward. The outside access doors to the Fordaire Unit were blown outward as were the vent doors on the left and right front of the shop body. The panel cover to the Fordaire Unit was pushed inward and the front and bottom panels of the gasoline heater bent and twisted by the blast. This vehicle is still in operating condition.

g. On the USS Saratoga, the rear doors of the ST-6 body were pushed inwards 2 inches and the right rear door glass blown into the shop truck, see Fig. 153 and Fig. 154.

SECRET



Fig. 149 - USS Nevada - Truck, Auto. Repair, 2 1/2 Ton,
6x6, M8A1 - View of STG body after Test Able.



Fig. 150 - USS Nevada - Truck, Auto. Repair, 2 1/2 Ton,
6x6, M8A1 - Rear view after Test Able.

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Fig. 151 - USS Nevada - Truck, Auto. Repair, 2 1/2 Ton, 6x6, M8A1 - Front view after Test Able.



Fig. 152 - USS Nevada - General view after Test Able showing damage to Truck, Auto. Repair, 2 1/2 Ton, 6x6, M8A1 and Truck, 2 1/2 Ton, 6x6 Amphibian.

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Fig. 154 - USS Saratoga - Truck, Auto.
Repair, 2 1/2 Ton, 6x6, M8A1 -
Interior view of ST6 body after
Test Able.



Fig. 153 - USS Saratoga - Truck, Auto. Repair,
2 1/2 Ton, 6x6, M8A1 - View showing
damage to rear of ST 6 body.

154
SECRET

SECRET

C. FIRE CONTROL

1. Binoculars, M15A1 (Item 28)

a. The moulded plastic body of the binoculars displayed on the USS Arkansas showed an imprint, on the side toward the blast, of the wires used to hold them to the pallet. The plastic had hardened to its original state at the time the ship was reboarded three days after the blast. The eyeguard and objective cell covers had expanded very slightly. They were not sufficiently loosened to allow accidental unscrewing. The leather carrying case was lightly charred on its exposed side. On all ships the exterior lens surfaces were coated with a sooty film which became less dense as the distance from the bomb burst increased.

2. Circle, Aiming, M1 (Item 29)

a. The paint on the aiming circle and tripod displayed on the USS Arkansas was scorched on those sides toward the blast. One leg of the tripod was bent 5 degrees at a point four inches from its lower end. The only other evidence of damage on this item was a scorching of the tripod on the USS Saratoga.

3. Clock, Message Center, M1 (Item 30)

a. There was a slight charring of exposed portions of the wood cases on all ships except the USS Nevada. The clock dial on the USS Arkansas had been lightly blistered and tarry droplets had gathered on the inside of the glass face. All clocks were running accurately when the ships were reboarded.

4. Director M7A1E1 (Item 31)

a. The blast struck the Director M7A1E1, on the USS Arkansas, on the front, right side, and top. The paint on these areas as well as on top of the telescopes was scorched. All front windows were cracked, the present angular height window pushed inward and shattered. Fig. 155. The future range and angle of train windows were also cracked. The present angular height and present altitude dials were scorched and slightly blistered but not to the extent that legibility was impaired. The fuse dead time handwheel was bent slightly but not enough to effect its serviceability. When first tried the present range handwheel jammed at 1000 yards. Later, without repair, the jam did not exist but binding was noticeable at these dial readings. Because of this

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Fig. 155 - USS Arkansas - Director, M7A1B1 - View showing damage to dial windows after Test Able.

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binding these two units were judged unserviceable. The cover plates were removed and the interior inspected. It appeared undamaged. This director has been shipped to Frankford Arsenal for further study. The present range slip clutch felt looser than when checked before the blast but was still serviceable. The Telescopes M17 were undamaged. The Elbow Telescope M1 was likewise undamaged except that the amber filter was cracked. This filter is a cap which is easily lifted off and its loss does not seriously effect the use of the telescope.

b. The blast struck the Director, M7A1B1, on the USS Nevada, mainly on the right side. The paint was severely scorched on the right side and top. The quadrant elevation window was cracked and the present azimuth window shattered. Removing the cover plates revealed no interior damage. The front prediction arresting button was found to bind. The present angular height handwheel was found to bind and was unserviceable apparently due to bending. The right telescope was unserviceable because of foreign matter on the reticle, in the field lens, and in the eye lens. The rubber eyeguard was blown away. The action of heat was apparent on the rubber headrest, eyeguards, and the reticle light cables. This director has also been sent to Frankford Arsenal for further study.

c. The Director, M7A1B1 on the USS Pennsylvania was partially masked. It showed little damage. The paint of one telescope was slightly scorched. The source of the blast was to the right and in front of the director. The parallax and present azimuth windows located on the right side of the director were broken. The prediction arresting button was found to bind, probably because of the action of salt water and spray. Although serviceable, a slight drag was evident in the present angular height and present azimuth handwheels.

d. The blast struck the Director, M7A1B1 on the USS Saratoga from the front and to the right. Here there was no masking and slight scorching was evident on those sides which were toward the blast. A cracked present azimuth window was the only further effect of the bombing.

5. Director M2A2 (Item 32)

a. The director on the USS Arkansas was damaged beyond repair.

(1) Computer M2A2 - This unit was damaged

SECRET

beyond repair, see Fig. 156, Fig. 157 and Fig. 158. In this report the correction panel which faces the rear of the trailer, will be considered as the front of the computer. The blast struck the top, rear, and right sides. All four covers were torn from their fastenings, one being carried 30 feet from the trailer. The top was partially torn free and crushed inward, see Fig. 158. The complete unit was twisted, bent, and torn from the shock mounting, and the shock mounting torn from its clamps. The clamps were bent and broken. The computer frame was bent at the front left corner as though it had struck the side of the lower trailer body, see Fig. 158 and Fig. 159. The adjustment panel was blasted inward, the meters blown from it and smashed and the switches rendered inoperable, see Fig. 160. A large number of amplifier units were twisted and torn from the frame. A few vacuum tube receptacles were cracked and twisted. Those few vacuum tubes that were broken were crushed by the twisting of the computer frame and the resultant shifting of component units. Vacuum tubes withstood the blast and subsequent testing revealed no internal damage. Some wiring was broken due to units shifting. The servo oil levels were slightly low but no leaks were evident. Although the computer was unserviceable as such, the majority of its component units were individually undamaged. See Fig. 159, Fig. 160, Fig. 161 and Fig. 162.

(2) Altitude Converter, M2. This unit, with the top panel of the power unit, was blown to the deck against the ship's turret six feet to the right of the trailer. The side and top panels were pressed inward. It was overturned and oil from the potentiometer saturated the internal mechanism. The range and range reset mechanisms were bent making them inoperable. The handwheel of the altitude mechanism was broken. The microammeter was blown inward, crushing itself against the internal mechanism. This unit cannot be economically repaired.

(3) Power Unit M3 - The cover and the top were blown off. The left side was crushed inward smashing the 2740 and 393A tubes and three tube sockets, see Fig. 163. The unit was torn from its shock mounting, but the shock mounting remained clamped to the trailer floor. The transformer unit on the right was torn from the frame

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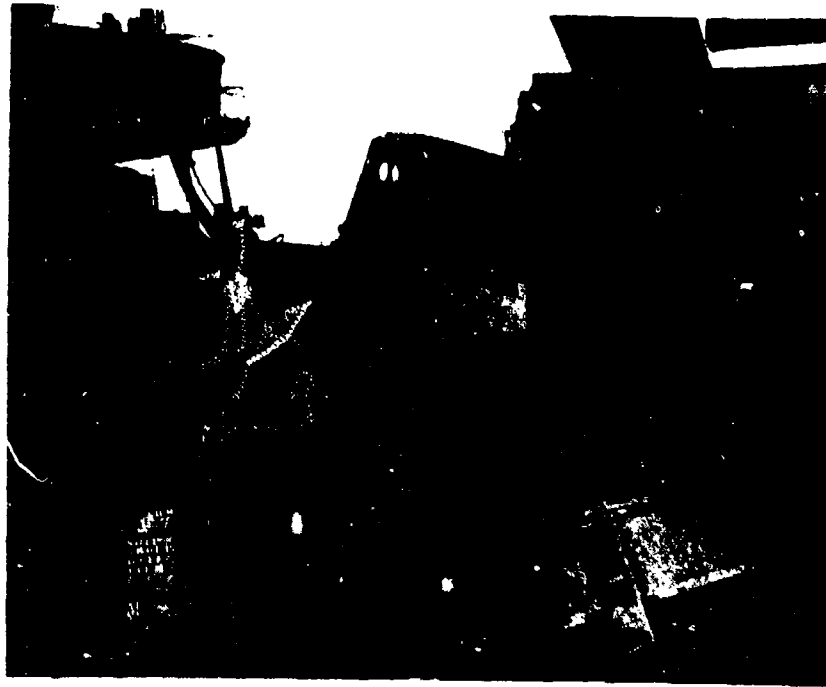


Fig. 156 - USS Arkansas - Director, M9A2 - Left rear view of director components and trailer, M14 after Test Able.

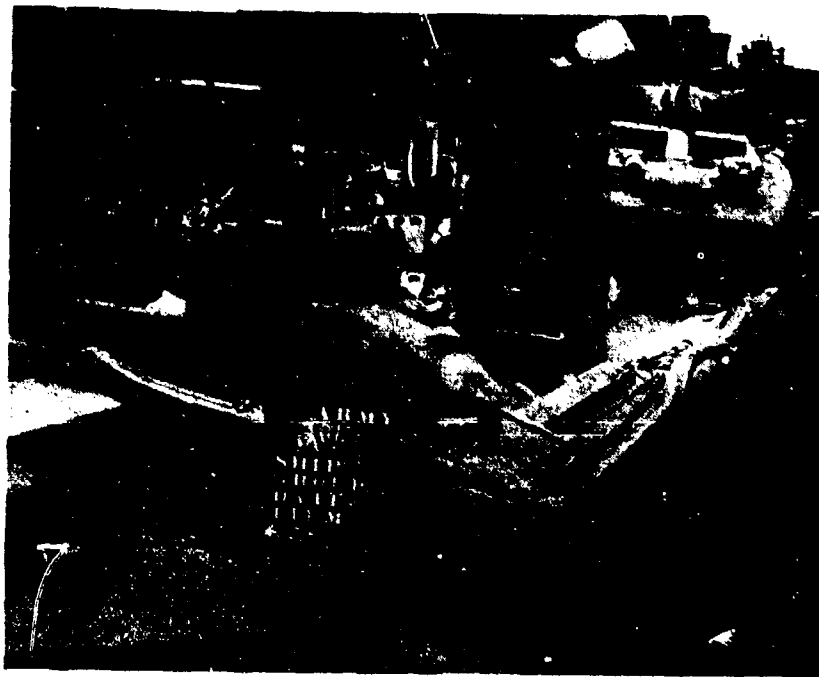


Fig. 157 - USS Arkansas - Director, M9A2 - Left front view after Test Able.

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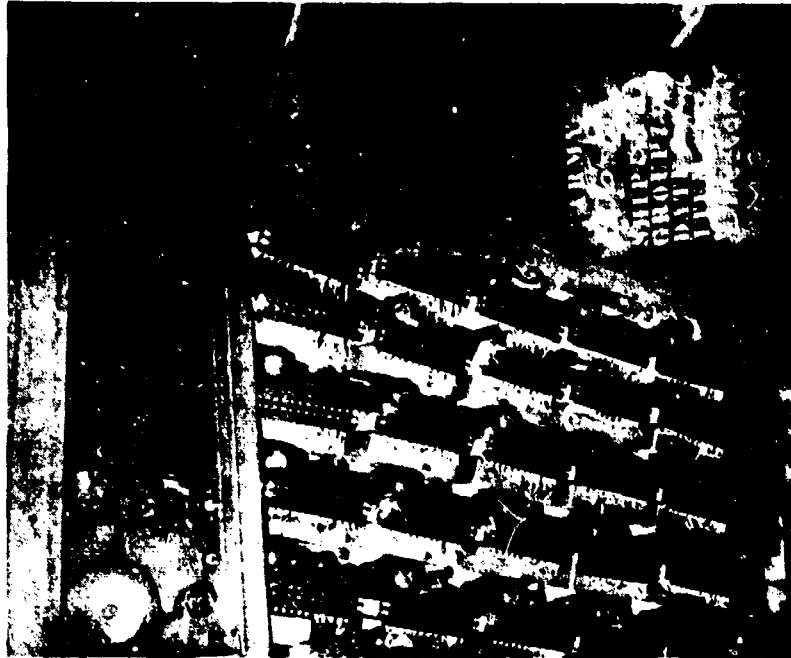


Fig. 159 - USS Arkansas - Computer, M3A2 -
Correction panel side (front)
after Test Able.

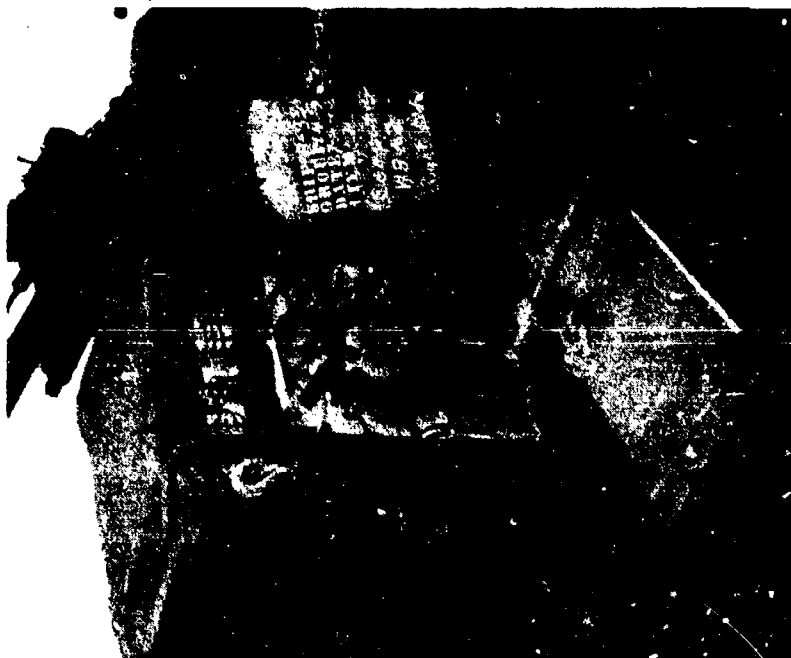


Fig. 159 - USS Arkansas - Computer, M3A2 -
Left front view after Test Able.

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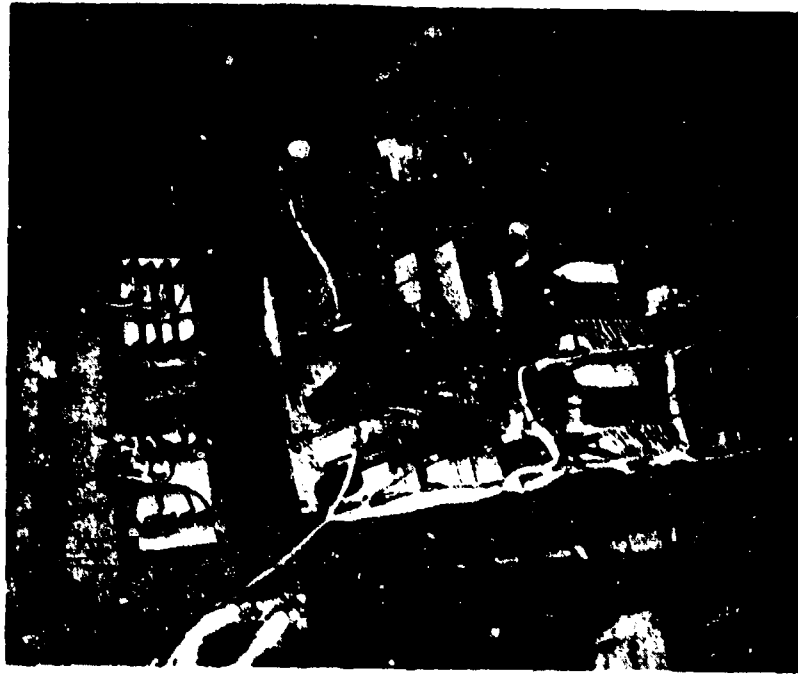


Fig. 161 - USS Arkansas - Computer, M3A2 -
Left side view after Test Able.

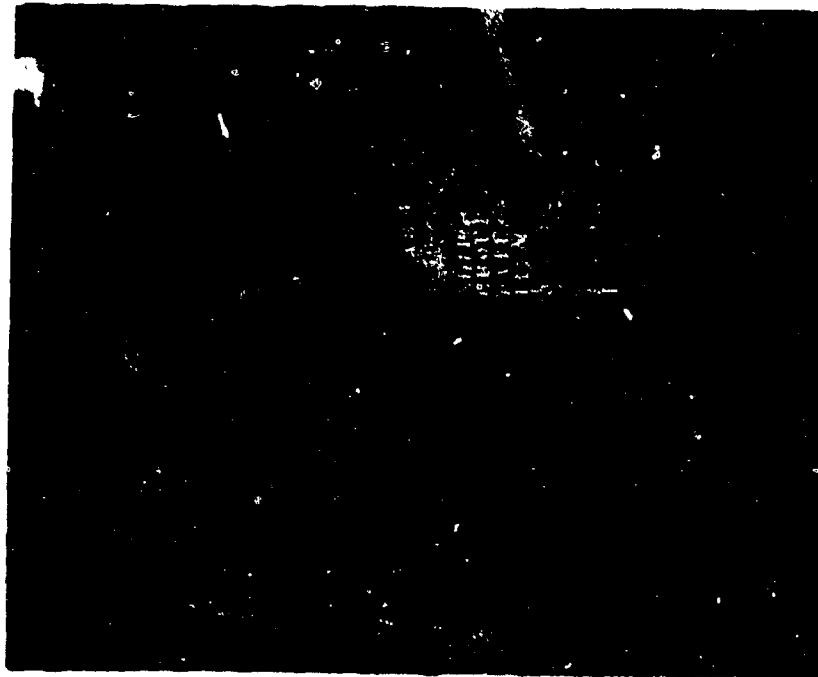


Fig. 160 - USS Arkansas - Computer, M3A2 -
Adjustment panel side (right)
after Test Able.

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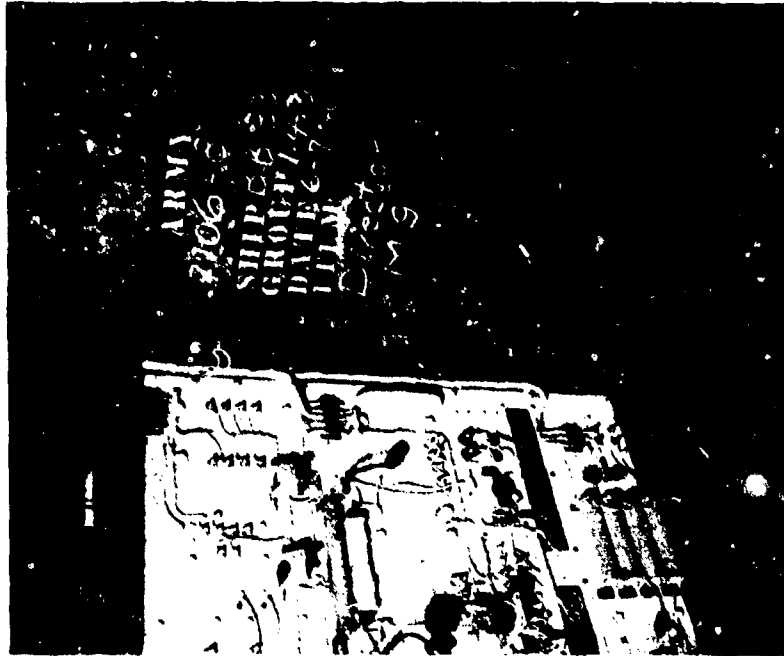


Fig. 163 - USS Arkansas - Power Unit, M3-
Left side after Test Able.

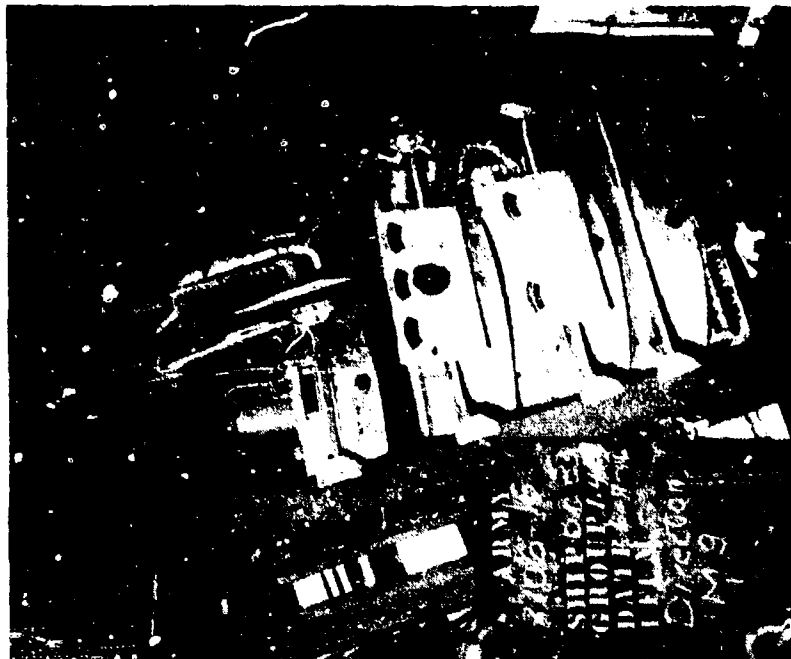


Fig. 162 - USS Arkansas - Computer, M3A2 -
Rear view after Test Able.

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and left hanging by the wire leads, several of which were broken. A 393A thyratron tube on this unit was shattered, see Fig. 164.

(4) Tracker, M2 - This item was severely damaged. The two bolts used to hold the blast side tripod legs to the deck were sheared and the tripod skidded two inches with the blast. The front, rear, right, side, and top were crushed inward by the blast and pressure, Fig. 165. The paint on the front, top, and rear were discolored ranging from reddish brown to black. The tracker would not operate 360° in traverse. The top was removed and it was found that it had pushed down on the servo top denting it downward also. When the servo top was removed it was found that the binding was caused by contact between the dent and connections on the contact spider. In attempting to traverse the tracker several of these had been sheared. This was the only damage apparent in the interior of the tracker case. The seat locking-knobs were sheared off. Damage to the elbow telescopes was limited to scorching the diopter scales to illegibility.

(5) Trailer M14 - The trailer body was irreparably damaged. The frame, wheels, axles and towing rig were undamaged. The trailer body above the basic lower section was ripped off and deposited in a mass, Fig. 156, Fig. 157 and Fig. 166. Although the leveling jack pads were welded to plates bolted to the deck, the trailer was skidded almost 3 inches to the right, compressing the tire side walls on the side. The jack legs were bent but the operating mechanism undamaged. The lower trailer body was blown to the right as may be seen in the above photographs. The interior lighting and heating systems were demolished as a result of the crushing of the body. The running lights were undamaged.

b. The Director, M3A1 on a Trailer M-13 on the USS Nevada received considerable damage from the blast. It could be repaired but would require numerous replacements of damaged parts. The unit was not energized after the bombing. It has been shipped to Frankford Arsenal for further study.

(1) Computer M3A1 - See Fig. 167. All four side covers and the top were carried away by the blast. The glass windows of the meters were forced back against their dials (x,y,h rate meters, slant ranges-altitude-voltage-check meter, zero

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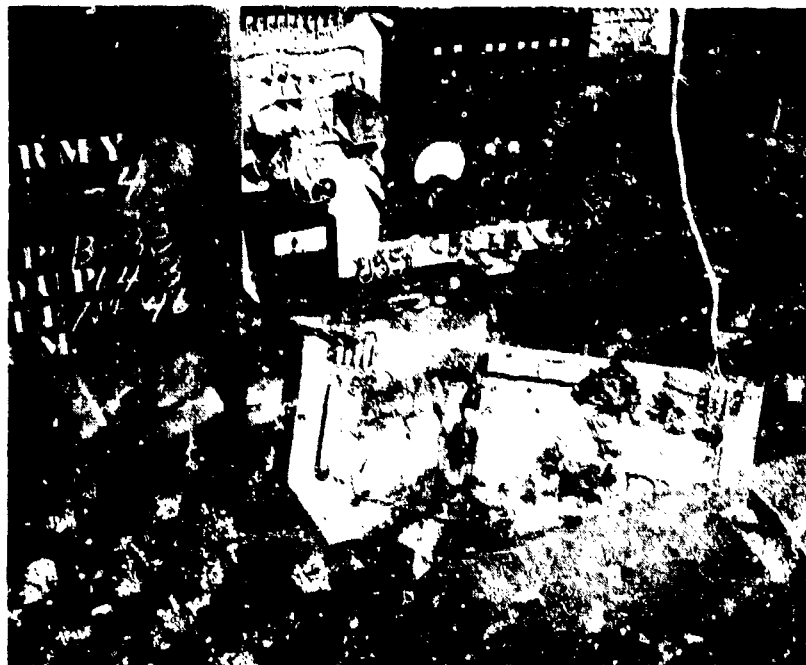


Fig. 164 - USS Arkansas - Power Unit, M2 - Right side view after Test Able showing displacement of transformer unit.



Fig. 165 - USS Arkansas - Tracker, M2 - Right side view after Test Able.

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Fig. 166 - USS Arkansas - Director, M9A2 - View after Test Able showing roof and sides torn from trailer, M14.



Fig. 167 - USS Nevada - Computer M3A1 - Left side view after Test Able.

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set and 350 V balance meter). The glass windows of the transmitted data dials were shattered. In addition the bakelite mounting ring on the voltage-check-slant-range meter was broken in two places, removing a segment of about 60°. On the interior of the computer, the terminal strip covers on "F", "E", "Hpc" and "plus R" amplifiers were broken or cracked by blast. One connection (no. 9 on the "T" modulator amplifier) was broken. Two of the 350-B vacuum tubes of the -190 volt regulator had their envelopes broken probably by the falling of the cover plate. The cover plate over the elevation dials on the elevation servo was bent inward but apparently did not interfere with the movement of the dials. All metal surfaces were corroded by salt water rayed on the unit by damage control parties. This will probably impair the operation of gang switches, such as the air density, range spot, and other correction potentiometers.

(2) Altitude Converter M2 - This unit was severely damaged. It was ripped from the top of the power unit and hurled to the deck of the ship, see Fig. 168. All four sides and top were pushed inward. Potentiometer oil had leaked because of its position after the bombing and saturated the internal mechanism. Because of the extensive bending of the frame and covers it was impossible to examine the interior at the time. The height dial was off center and the range handwheel bent indicating that the unit was unserviceable.

(3) Power Unit M3 - This unit suffered little damage. Both cover panels were dislodged but only slightly bent. The top was torn free when the altitude converter was dislodged. See Fig. 169. One of the 393A grid controlled thyratrons in the -190V rectifier was destroyed. There was considerable evidence of salt water corrosion.

(4) Tracker M2 - The cover was pushed inward by the blast and pressure, see Fig. 170 and Fig. 171. One level vial was crushed by the rear panel. The reticles of the elbow telescopes were unserviceable because of dirt in one case and moisture in the other.

(5) Trailer M13 - The trailer was displayed without its canvas cover. The body was badly bent in front and slightly on the sides. The

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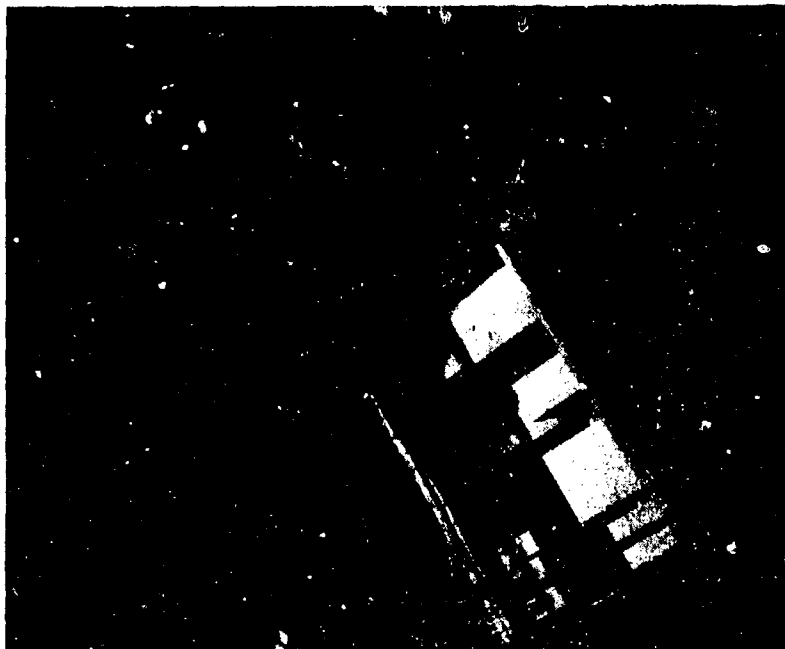


Fig. 169 - USS Nevada - Power Unit M8 -
Top view from left side
after Test Able.

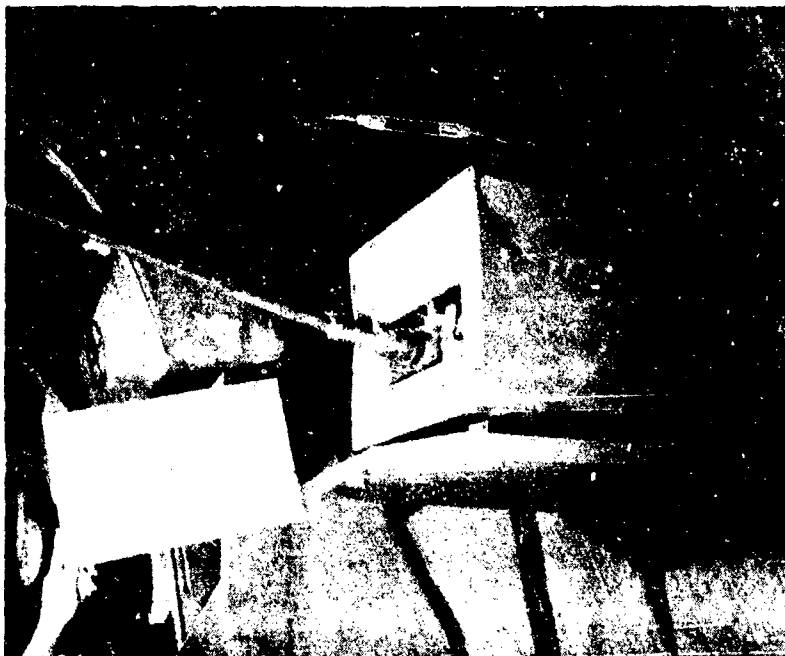


Fig. 168 - USS Nevada - Altitude Converter,
M2 - View showing the converter
blown to the deck in Test Able.

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Fig. 170 - USS Nevada - Tracker M2 - Front view after Test Able.

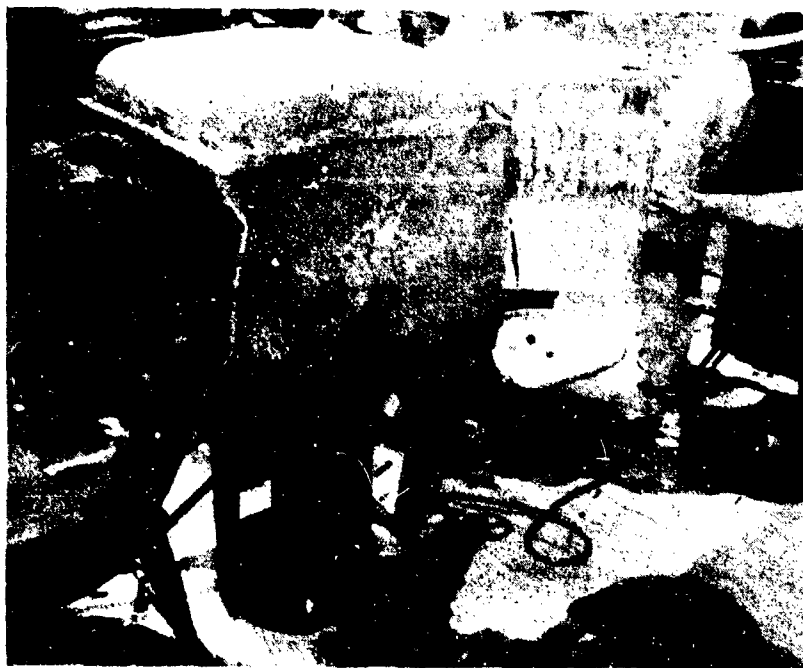


Fig. 171 - USS Nevada - Tracker M2 - Rear and left sides, after Test Able.

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paint was badly scorched on the front and sides. The frame was sprung on the right side. Leveling jacks were damaged beyond repair. Pieces of rubber were torn from the left tires. The rear of the trailer was moved 6 inches to the right by the blast, puncturing the left rear tire on its chock. The front end was moved a like distance to the right. Heat rendered the plastic red and amber driving reflectors unserviceable. The brake jumper cable was cut and badly charred. The hand brake assembly was sprung slightly.

g. The director was only slightly damaged on the USS Pennsylvania. It was repaired and returned to serviceable condition. It had been struck by the blast on its rear left but was partially shielded by the generating unit. Fig. 172.

(1) Computer, M3A2 - Both side covers and the front cover were bent inward slightly. The cover on the plug side was bulged outward. On the adjustment panel side, one 6L6G tube and the terminal strip cover were broken in the plus R amplifier. The terminal strip covers on the plus Hpc and minus Hpc amplifiers were cracked by the blast. The glass dial cover of the 100 microammeter (zero set and 2 V bal) was forced inward 3/8" with no damage to the meter. Oil in the air filter meshes was blown inward by the blast, lightly coating the internal assemblies. Replacing the vacuum tube restored the instrument to serviceable condition.

(2) The altitude converter was undamaged.

(3) Power unit, M3 - The removeable covers were slightly bent. The unit was serviceable.

(4) Tracker, M2 - Except for a slight inward bowing of the right side by blast, this unit was undamaged.

(5) Trailer M14 - The blast entered through the rear doors bulging the sides and front. The front and left windows were shattered, see Fig. 173 and Fig. 174. The left rear door window was cracked. The interior paneling was bulged outward and cracked, see Fig. 174 and Fig. 175. The blower was displaced causing the fan blades to bend in the housing.

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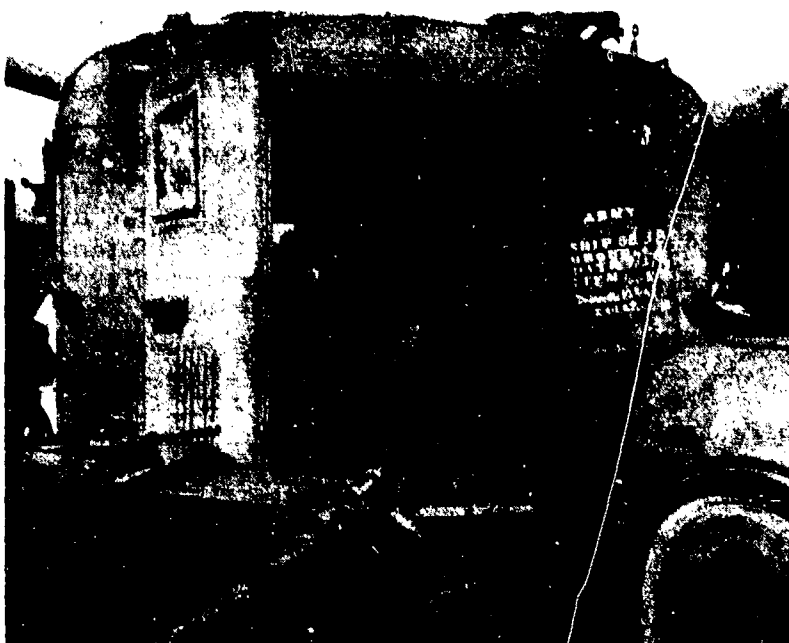


Fig. 172 - USS Pennsylvania - Director, M9A2 - Rear view of trailer, M14 after Test Able.

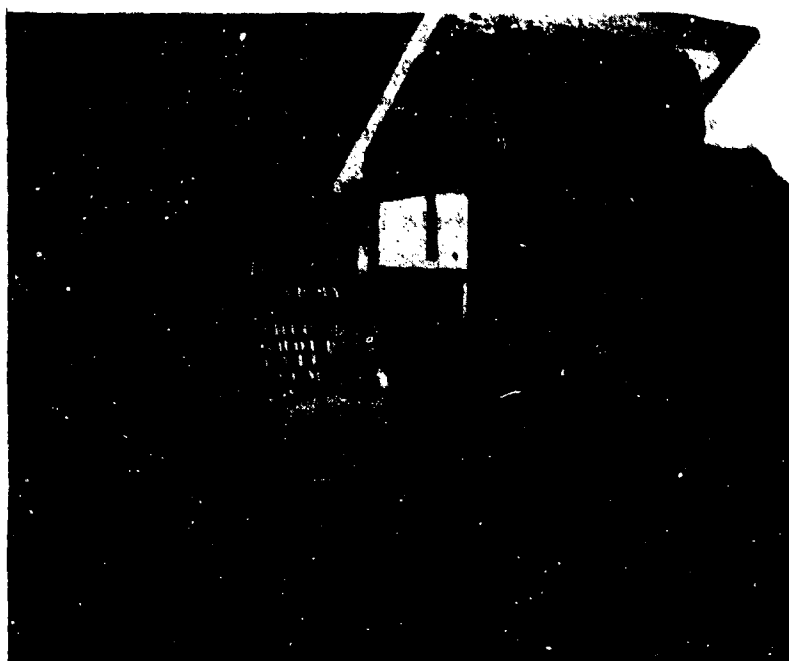


Fig. 173 - USS Pennsylvania - Director, M9A2 - Front window of trailer, M14 broken in Test Able.

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Fig. 174 - USS Pennsylvania - Director, M9A2 - Interior view of trailer, M14 showing cracked inner paneling and broken windows resulting from Test Able.

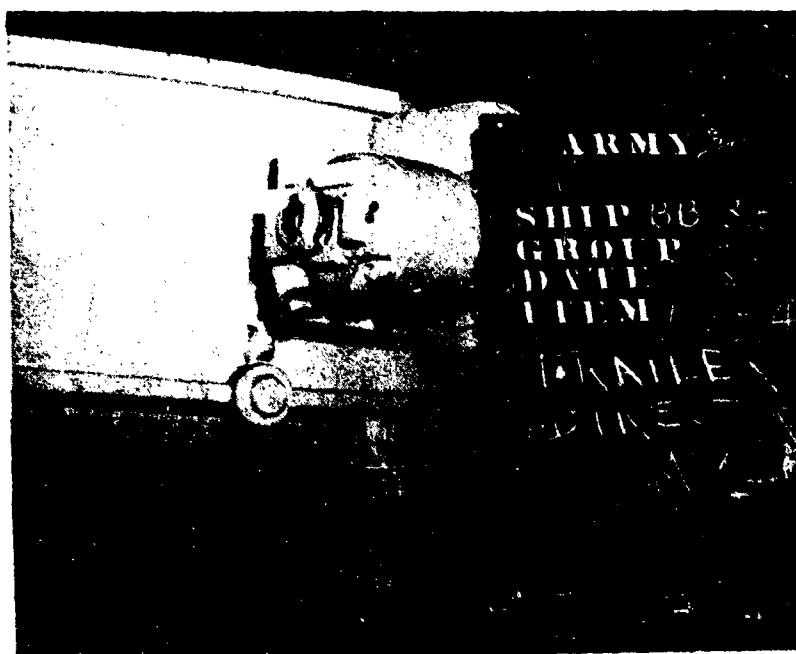


Fig. 175 - USS Pennsylvania - Director, M9A2 - Interior view after Test Able showing the deformed inner paneling in trailer, M14.

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d. M9A2 on the USS Saratoga. The damage on the USS Saratoga was limited to the trailer. The blast struck the left side, bowing it in slightly and breaking out the window on that side. The left door window and the right side window were cracked. See Fig. 176, Fig. 177 and Fig. 178.

6. Finder, Height, M1 (Item 33)

a. On the USS Arkansas the height finder was partially masked. Operating checks were not possible because of the lack of a director and power source. The bomb burst occurred to the rear and left of the instrument and the paint was scorched on those sides. The canvas on the left end of the telescope was torn and the metal dented slightly. The left rear carrying handle was bent inward until it almost touched the height finder body. See Fig. 179. The definition of the height finder telescope was poor and dark, possible due to displacement of interior optics. Cross field readings were difficult to make probably because of helium loss. The helium leakage existed before the bombing. Centering the height of image was two turns off. The change of magnification lever was jammed unserviceably at 24 power. The azimuth indicator window was smashed against the dial but the unit was apparently serviceable, Fig. 180. The operation of the elevation gear shift lever was stiff but serviceable. Both Elbow Telescopes M7 were serviceable. Both reticles showed several minute dirt spots and the diopter scales were scorched but legible. Both sunshade covers and all rubber eyeguards were carried away by the blast. This height finder has been shipped to Frankford Arsenal for further test and inspection.

b. The blast struck the front and left end of the height finder on the USS Nevada. The paint was severely scorched on all surfaces facing the blast. The helium pressure had leaked away. No leakage was evident at the time of the before bombing check. The azimuth indicator window was shattered and it appeared that the unit was unserviceable. The elevation adjustment knob binds but is serviceable. Both tracking telescopes were unserviceable. Dirt was evident on the erecting system, ray filters, and reticle. The eye lenses were chipped but serviceable. Blast carried away the rubber eyeguards on the two tracking telescopes and one from the height finder telescope, see Fig. 181. The height finder storage case was collapsed. See Fig. 76. The frame of the traveling carriage was broken by the collapse of the case. This instrument was shipped to Frankford Arsenal for further investigation.

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Fig. 176 - USS Saratoga - Director, M9A2 - Left window of trailer, M14 broken in Test Able.

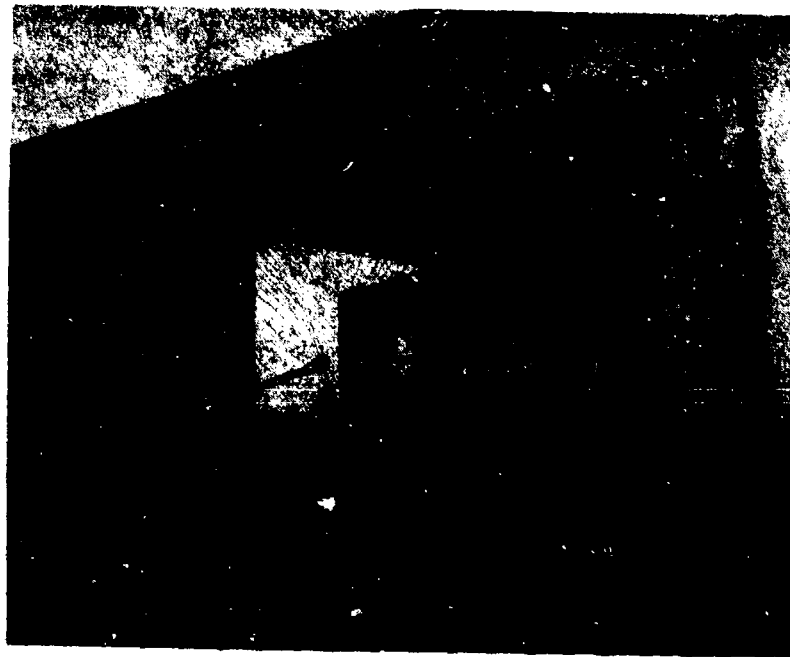


Fig. 177 - USS Saratoga - Director, M9A2 - Cracked right window of trailer, M14.

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Fig. 178 - USS Saratoga - Director, M9A2 - Interior of trailer, M14 after Test Able.



Fig. 179 - USS Arkansas - Height Finder, M1A1 - Damage to left end of tube and carrying handle after Test Able.

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Fig. 180 - USS Arkansas - Height Finder, M1A1 - View of cracked azimuth window after Test Able.

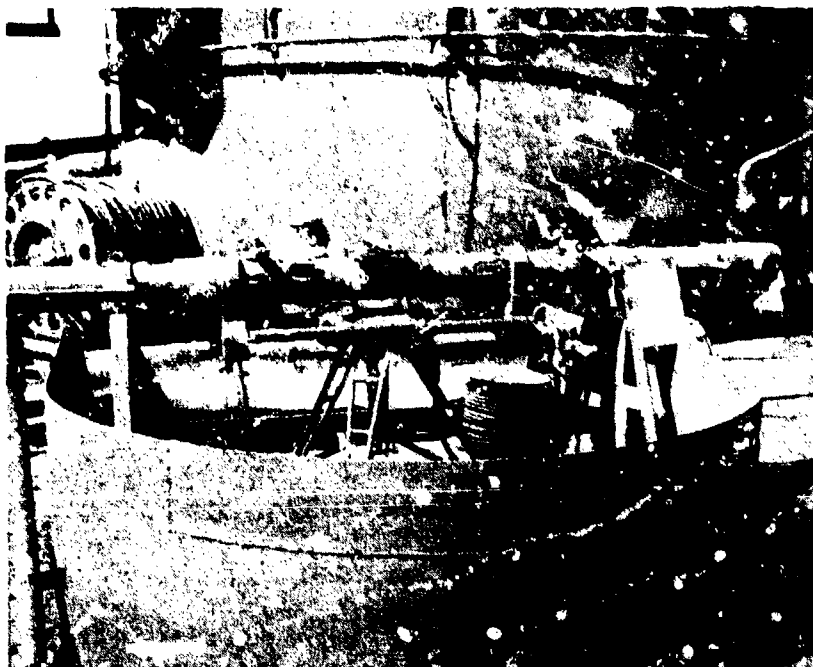


Fig. 181 - USS Arkansas - Height Finder, M1A1 - Front view after Test Able. Note missing eyeguards and sun shield cover.

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g. Relatively little damage occurred on the USS Pennsylvania. The blast struck from the left front. Scorching was evident on wiring and those surfaces exposed directly. One rubber eyeguard was missing. The objective lens of the azimuth tracking telescope was unserviceable due to separation. The sighting device on the upper right side of the elevation telescope was charred beyond usefulness.

d. Surface scorching was the only change on the USS Saratoga.

7. Finder, Range, M7 (Item 34)

a. The plastic body of this instrument on the USS Arkansas showed the imprint of the hold down wires on the side toward the blast. The adjusting lath and carrying case were carried away by the blast. Although exposed directly to the blast, the range finder was found to be serviceable.

b. The item on the USS Nevada was shielded from the blast and thus showed no effects from heat. The carrying case was torn from its fastenings and shattered by falling debris, see Fig. 182. The range scale reflecting prism was jarred from its seat.

c. The range finder on the USS Pennsylvania was masked and suffered no damage. On the USS Saratoga, although unshielded, it was likewise undamaged.

8. Syntan, Cable, M1 (Item 45)

a. The 19 pole, 325 feet cable, attached to the altitude converter on the USS Nevada had numbers 16 and 17 wires open. This cable also had the outer sheath cut by small fragments of metal. On all ships the rubber outer sheath was very slightly scorched, not enough to effect serviceability.

9. Telescope, TLO8E2 (Item 47)

a. On the USS Arkansas and USS Saratoga the paint of this item showed scorching, in the first case to the extent that refinishing is required. The Nevada's telescope, although shielded from the direct blast, received some secondary damage. The body was dented and the paint chipped by falling debris. A dusting of foreign matter was noticeable on the inside of the objective window and on the reticle. The instrument remained serviceable.

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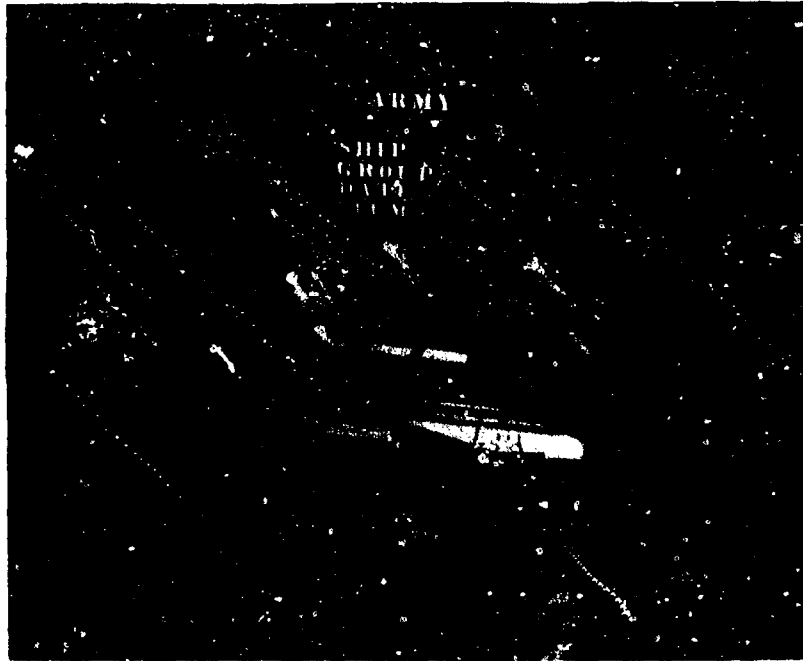


Fig. 182 - USS Nevada - Finder, Range, W7 - Carrying case shattered by falling debris during Test Able.

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10. Telescope, BC, M65 (Item 48)

a. This telescope was displayed separate from its tripod, lashed to the fire control pallet. It was exposed directly to the blast only on the USS Arkansas and USS Saratoga and in no case was it rendered unserviceable. On the USS Arkansas the eyeguards were expanded and thus loosened to a minor extent. The sealing compound had melted slightly on the rear of the head prism housing which was exposed directly to the heat of the blast. The notation strip below the diopter scale was made illegible by scorching.

11. Unit, Generating, M7A1 (Item 52)

a. This item on the USS Arkansas was irreparably damaged. See Fig. 183, Fig. 77 and Fig. 184.

(1) The blast struck from the rear and left side. Left and right throughout this section of the report will refer to the left and right sides of the trailer. The blast carried away the top and side panels and the radiator doors. The latter had been left open, the side panels closed and secured by their fastenings. The radiator was torn from the frame on the left side, pulling the bolts through the sheet metal of the support bracket, see Fig. 184. A 10 inch section was broken from the cast right side member of the radiator, see Fig. 185. The left side member was cracked at the lower end and the bottom tank was cracked at the outer left side. The latter, along with broken hose connections permitted the coolant to leak away. The upper outlet of the radiator was broken, see Fig. 185, and the other connections to the radiator were broken by reason of the hoses pulling free as the radiator was displaced. The top radiator support rod was carried away on the left side, breaking the base from the upper radiator tank. This caused a clean round hole in the tank, see Fig. 185. The center cover support was twisted and the front support almost flattened by action of the blast on the cover panels, see Fig. 183 and Fig. 184. As the radiator was forced back against the fan, the gear cover to which the fan bracket is attached broke where the bracket is bolted to it. This also bent the fan blades and distorted the fan shield, see Fig. 185 and Fig. 186. The fan belt was broken. The fuel tank was slightly crushed on the engine side. The front engine support was broken across the left bolt hole and just to the

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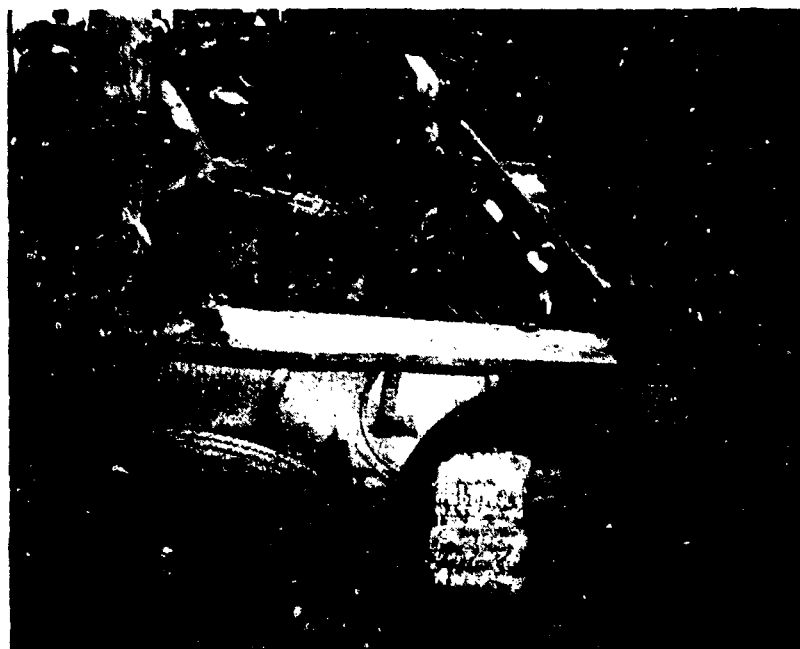


Fig.183 - USS Arkansas - Unit, Generating, M7A1 -
Right side view after Test Able.



Fig. 184 - USS Arkansas - Unit, Generating,
M7A1 - View from front of trailer
after Test Able.

179
SECRET

SECRET



Fig. 185 - USS Arkansas - Unit, Generating, W7A1 -
Damage to radiator and left side of engine.



Fig. 186 - USS Arkansas - Unit, Generating, W7A1 -
View showing damage to right side of engine
after Test Able.

180
SECRET

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left of the right bolt, see Fig. 187. The rear of the unit is supported by a bracket cast as part of the alternator housing (actually located toward the front of the trailer). These brackets were undisturbed except for a hair crack leading out from the forward bolt hole on the left side. The elbow leading from the engine air filter to the carburetor was blown from the carburetor, shearing the two 3/8" bolts which secure it to the carburetor. The air filter was crushed by the blast. The throttle box was broken from between the throttle body and intake manifold at the bolt holes. Fig. 186, shows the breakage at the carburetor and intake manifold. The throttle box is not shown. In the above figure the line for exhausting fumes from the crankcase may be seen bent over the intake manifold with the upper elbow torn from the carburetor. The governor linkage was broken free at the carburetor end, and bent, see Fig. 186, lower right. The remaining engine damage was limited to the electrical system and was apparently caused by flying debris. Number four spark plug was broken off just above the metal and the wire leading to it sheared. The ignition coil had been struck on top with sufficient force to bend its bracket downward, cracking the top insulation and carrying away the wires, see Fig. 185. The battery was partially upset and the case cracked.

(2) The alternator and exciter were undamaged. The instrument panel was forcibly dislocated when the generator cover supports were twisted and bent, see Fig. 183. All of the bolts holding the panel to the support were sheared and the panel bowed slightly away from the blast. Several wires were broken when the panel was displaced. All gages and bulbs appeared to be undamaged except the tachometer. The tachometer was pulled to the rear from the panel and literally pulled apart. All fuses were blown from the fuse panel located on the left forward side.

(3) Although the generating unit was exposed to the full blast, the left side of the trailer was partially shielded. The rear left side and rear were severely scorched varying in color from reddish brown to black. The trailer was skidded across the splash pan in which it was mounted, forcing the right wheels against the side of the pan. The wheels were forced over a 4" angle iron welded to the bottom of the pan to prevent this

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Fig. 187 - USS Arkansas - Unit, Generating, M7A1 -
Broken engine support resulting from
Test Able.

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movement. In striking the pan side, the right rear wheel hub was broken, see Fig. 183 and Fig. 188. The cable used to secure the left rear corner of the trailer was pulled loose. The leveling jacks had been lowered and were supporting the weight of the trailer. In skidding, all the jack legs were bent to the left making them unusable for this reason. The mechanism for raising and lowering the jacks was unaffected. The body was bowed slightly on the left side from the blast and on the inner right side partly by the blast and partly from being struck by some object that pierced the sheet metal, see Fig. 77. The same photograph shows the damage to the tail gate after it was blown upward from the lowered position, bowing it and breaking one spoke. This in no way affected the braking mechanism. The plastic reflectors and plastic cover lenses for the trailer lights, exposed to the heat of the blast, were discolored and the surface shriveled. The left rear daylight stop and tail-light lens frame was bent and the plastic lens missing.

b. The generating unit on the USS Nevada was similarly badly damaged.

(1) The blast struck from the front left side of the trailer breaking the left front cable used to secure the trailer to the ship's deck. The blast forced the trailer backward raising the left rear wheel onto the chock on that side and skidding the trailer so that the left front wheel was forced to the side of the splash pan in which it was mounted, see Fig. 139. The paint was somewhat scorched on the directly exposed left side and front of the unit. The top and side panels of the generating unit cover were carried away by the blast. The top radiator support rod on the left side was likewise carried away, breaking its boss from the cast upper radiator tank, see Fig. 190. As can be seen in the same photograph, the cooling system was further damaged. The engine outlet hose was badly torn and the cast connection to the upper radiator tank was broken at its attaching lugs. The radiator itself was damaged by flying debris slicing four front tubes. The fan shield and fan were bent toward the radiator on the left side, see Fig. 190. The fuel tank cap and filler pipe were pushed down by the blast. This caused a breakage where the pipe enters the tank and also a bend in the top of the tank.

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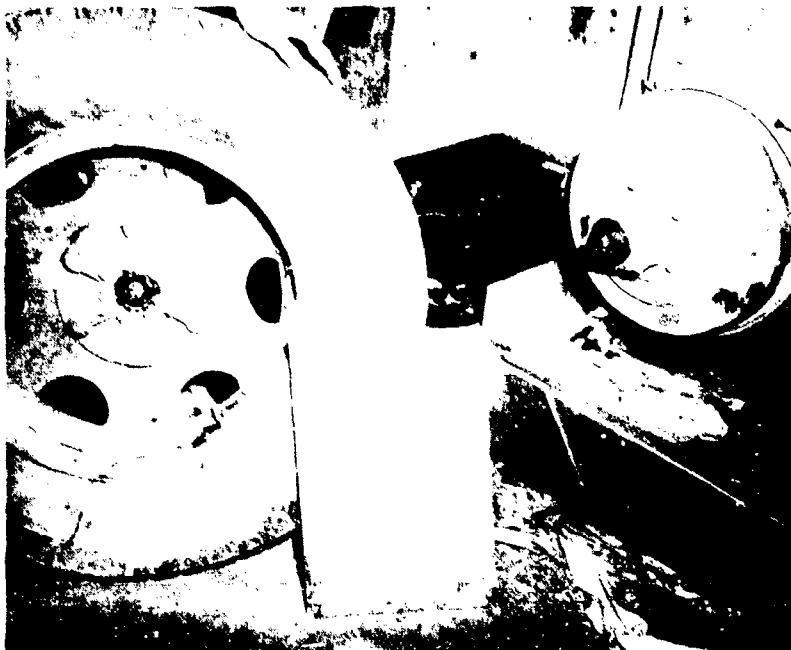


Fig. 188 - USS Arkansas - Unit, Generating, M7A1
Damage to right rear wheel.



Fig. 189 - USS Nevada - Unit, Generating, M7A1 -
General view from left front of trailer.

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Fig. 190 - USS Nevada - Unit, Generating, M7A1 -
Damage from Test Able to cooling system
and carburetion unit.

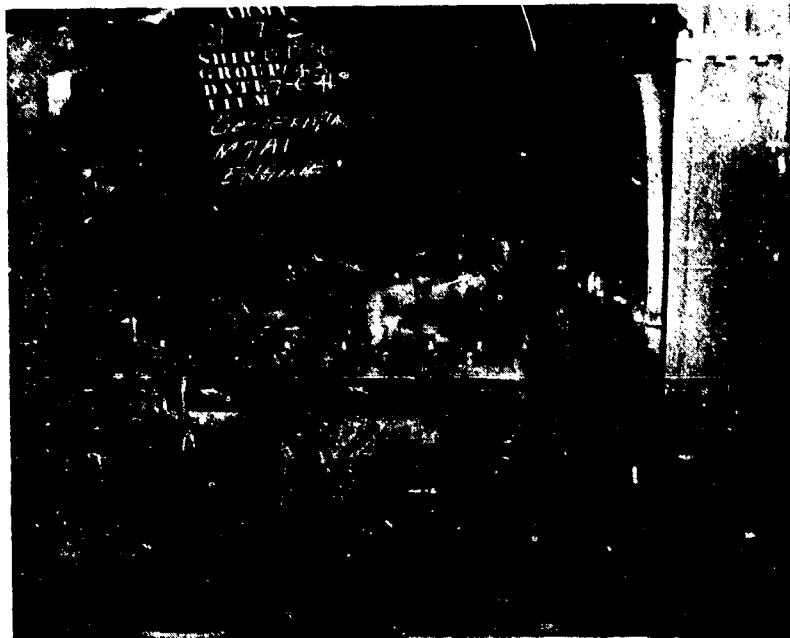


Fig. 191 - USS Nevada - Unit, Generating, M7A1 - Left
side of engine after Test Able.

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The throttle body was broken where it attaches to the intake manifold, see Fig. 190 and Fig. 191. This allowed the carburetor to be carried to the rear of the engine, pulling free the governor linkage and the crankcase exhaust line from it. The engine air filter was blown from the carburetor intake elbow and bent to the extent of unserviceability. The number four spark plug wire was pulled loose without damage to the plug or wire. This was the only damage to wiring on the unit. The battery was unserviceable because of a crack down the center of the left side which permitted the electrolyte to escape.

(2) The bolts holding the rear of the instrument panel to the center cover support were sheared, permitting that end of the panel to swing outward, see Fig. 192 and Fig. 193. Damage to the instrument panel was limited to a broken light bulb and a broken glass covering the engine temperature gage, see Fig. 193. The temperature gage was otherwise undamaged. The fuel gage was rendered inoperable because of damage to the tank unit.

(3) The trailer frame was sprung. The body was dished slightly by the blast. The left front stowage compartment door was sprung slightly, see Fig. 189. Glass splinters were imbedded in the left tires and the front left tire was torn through the sidewall, in a three inch circle. This tire was not flat but was unserviceable because of the tear. The rear leveling jacks were broken off. All reflectors on the blast side were shrivelled on the surface from the heat of the blast.

g. The damage on the remaining two ships was confined largely to the generator side cover panels and to paint scorching on the blast side. On the USS Pennsylvania the panels on the left side were blown inward by the blast, the rear one until it almost touched the carburetor linkage. The latches on these panels are not useable as a result. On the USS Saratoga the unit was displayed with the side panels raised. The panels on the left side, toward the blast, were torn from the cover. The screws were pulled through the hinges. The red plastic reflector on the left side of the USS Pennsylvania trailer was shrivelled by the heat of the blast, and thus unserviceable.

12. Watch, pocket (Item 53)

a. Only those watches on the USS Arkansas and

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Fig. 192 - USS Nevada - Unit, Generating, M7A1 - Right side view after Test Able.



Fig. 193 - USS Nevada - Unit, Generating, M7A1 - Damage to instrument panel resulting from Test Able.

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USS Saratoga were exposed directly to the blast. In both cases the watches were unaffected. The watch on the USS Pennsylvania was shielded from the blast and likewise undamaged. The watch displayed on the USS Nevada had been repaired by the Naval repair ship, USS Ajax, prior to the bombing. Although shielded from the blast, the watch has since operated erratically. No magnetism was evident. The watch has been shipped to Frankford Arsenal for further examination.

13. Watch, Wrist (Item 84)

a. The only damage to this item was found on the USS Arkansas. The crystal had been distorted so that it now fits loosely in the bezel. The luminous paint on the hour hand had melted slightly and run through enough to catch and stop the second hand. Upon freeing the second hand, the watch operated satisfactorily.

SECRET

D. SMALL ARMS AND AIRCRAFT ARMAMENT.

1. General

a. As displayed, each item was devoid of preservative on all its exposed outside surfaces. The protective film of oil was still present inside mechanism and on the exterior surfaces away from the bomb burst. Even where only slight masking was present (such as adjacent weapons in a pallet display) the protecting oils were still left intact. Where the oil was removed, unpainted steel surfaces were rusted to varying degrees depending on the finish. This rust was due to salt water spray incidental to fighting fires on the various ships and to several days exposure in a tropical atmosphere. There were no fires in or around the pallet displays themselves. The displays were generally covered with small bits of debris and soot. This condition was most apparent on the USS Arkansas which was not boarded until four days after the bomb drop. An indication of the untidy appearance of the pallet displays on this ship may be seen in Fig. 194 and Fig. 195.

b. Weapons other than standard are listed below:

- (1) Browning Automatic Rifle, cal..30, M1918A2, USS Arkansas, bipod not received with gun.
- (2) Browning Automatic Rifle, cal..30, M1918A2, USS Pennsylvania, wooden stock cracked longitudinally but not enough to render it unserviceable.
- (3) Carbine, cal..30, M2, USS Saratoga, magazine not received with gun.
- (4) Parachest, M8A1 and Paracaisson, M8A2, USS Nevada and USS Saratoga, parachute suspension straps not affixed.

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Fig. 194 - USS Arkansas - Pallet display
after Test Able.

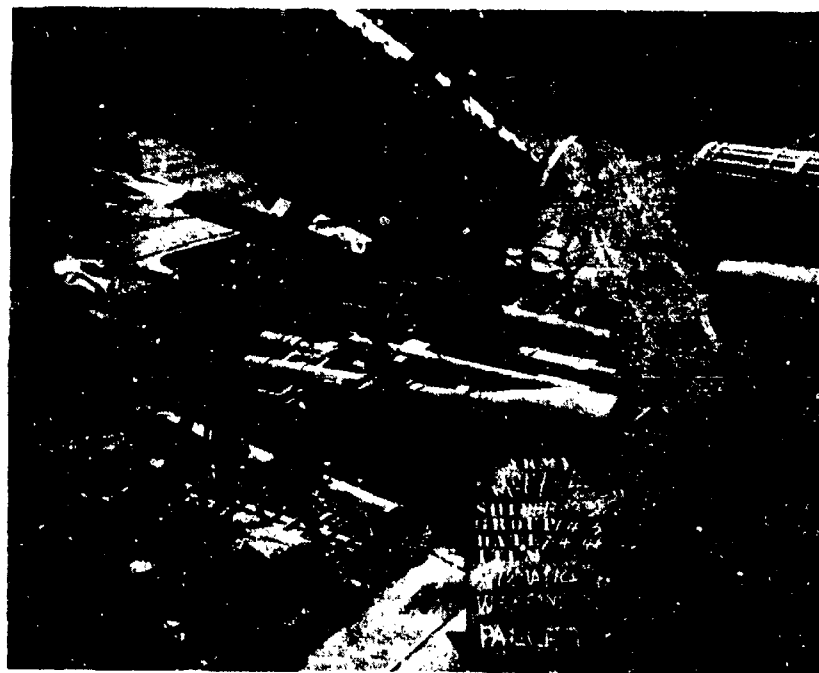


Fig. 195 - USS Arkansas - Pallet display after Test Able.

190-
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2. Carbine, Cal..30, M2 (Item 1)

a. On the USS Arkansas, the stock and hand guard were lightly charred but only where they were exposed. The bolt was somewhat more rusted than the other steel parts of the gun but was not pitted. The magazine was excessively rusted but the dummy ammunition was unaffected, see Fig. 194.

b. The bolt was somewhat more rusty than the rest of the gun on the USS Pennsylvania. No visible damage was sustained by this weapon on the other ships.

3. Gun, Machine, Cal..30, M1917A1 (Item 3)

a. The right hand grip of the weapon on the USS Arkansas was lightly scorched. The barrel was rusty where it protruded from the jacket. There was no visible damage to this gun on the other three ships. Each still contained a full water jacket. Other than slight scorching of the paint on the exposed side on the USS Arkansas, none of the Tripods, M1917A1 showed any damage.

4. Gun, Machine, Cal..60, T17E3 (Item 7)

a. On the USS Arkansas, the solenoid and the protruding portion of the charger were scorched. This weapon, on all ships, did not rust as badly as adjacent weapons. No damage was suffered on the remaining ships. The electric chargers and solenoids were not operated due to the absence of suitable current but the guns were charged and dry-fired manually.

5. Gun, Submachine, Cal..45, M3A1 (Item 8)

a. The magazines on these guns were excessively rusted although there was no effect on the dummy ammunition in them. There was no damage to the guns themselves.

6. Helmet, Steel, M1 (Item 9)

a. On the USS Arkansas, the helmet was lightly scorched on the side exposed to the burst. The paint was not removed.

b. On the USS Pennsylvania, the liner became dented where it was strapped to the pallet. The other two helmets were unaffected.

7. Holster, Pistol, M1916 (Item 10)

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a. This item on the USS Arkansas was lightly charred on the exposed outer side. The leather was dry and had lost some of its flexibility, but was easily restored to use by cleaning. The holsters on the other three ships were slightly stained from exposure to salt water spray and sun, but were still fit for issue after a minor cleaning operation, see Fig. 194.

8. Knife, Trench, M4, and Scabbard, Trench Knife, M8A1 (Item 11).

a. On the USS Arkansas, the webbing of the scabbard was exposed where the rubberoid had been removed from the topside by heat. The knife was not damaged. No visible defects were noted on either knife or scabbard on the remaining displays.

9. Launcher, Rocket, 2.36" M9E2 (Item 12).

a. On the USS Nevada, this piece was struck by a falling object marring some paint on the wire wrapping. No damage was noted to any of the other launchers and each fired a testing squib. The optical elements of the T90 Reflector Sight were still serviceable but the elevation index on all four launchers was excessively corroded.

10. Pistol, Automatic, Cal..45, M1911A1 (Item 13)

a. There was no functional damage to any of these weapons.

11. Rifle, Browning Automatic, Cal..30, M1918 A2 (Item 14).

a. On the USS Arkansas, the right side of the forearm was lightly charred and the magazine was excessively rusted. Some falling debris on the USS Nevada struck the rifle, bending the rear sight windage screw slightly.

b. On the USS Pennsylvania, this item was on the edge of the pallet exposed to the bomb and shielded the rest of the display. The wooden forearm and stock were lightly charred on the right side. There was no damage to this weapon on the USS Saratoga.

12. Rifle, Recoilless, 75mm, M20 (Item 15)

a. None of these guns were visibly damaged. This weapon did not rust as badly as adjacent weapons in the same display. A slight scorching of the paint on the sighting equipment of the rifle displayed on the

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USS Arkansas was noted. The rubber eye guards were dried and cracked. The optical properties of the sights on all four weapons were unimpaired.

13. US Rifle, Cal..30, M1C (Item 16).

a. On the USS Arkansas, the stock, hand guard and cheek pad were lightly charred. The telescope mount and the tube of the M82 Telescope were entirely covered with rust. The optical elements on this sight were still serviceable.

b. The stock and hand guard of this rifle on the USS Pennsylvania was lightly charred on the top where it was directly exposed. The cheek pad was charred appreciably on the upper portion but this ended abruptly where an adjacent item on the pallet masked the lower half. The charring was removed by scraping with a knife. The pad is serviceable although it might be replaced for appearance. The rubber in the objective lens had broken down enough by heat to allow the several elements to separate. The tube to the telescope and the telescope mount were excessively rusted in striking contrast to the other steel parts of nearby weapons. The damage to the lens rendered this telescope unserviceable.

c. No damage was sustained by the weapon, on the USS Nevada and USS Saratoga, other than the same rusting of the telescope tube and mount as noted in subparagraphs a and b above.

14. Shotgun, 12 gage, Riot Type, w/Lug (Item 17)

a. On the USS Arkansas, the stock and hand grip became lightly charred on the exposed side. On the USS Saratoga, the butt plate was lightly charred. Although all of these weapons in a short time became more rusty than the others in the pallet displays, there was no visible or functional damage and no difficulty was experienced in cleaning.

15. Gun, Automatic, 20mm, AC, M3 (Item 18).

a. No visible damage was sustained by any of these guns. This weapon did not rust as badly as other weapons in the same display.

16. All the weapons on the pallet displays were operated through several cycles and dry fired. Since the proper current of electricity was not available, the cal..60 and 20mm air-craft guns were operated manually. No difficulty was encountered in cleaning any of the small arms weapons.

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17. Gun, 75mm, AC, M10 w/Mount, M10 and Feed Mechanism, M4, (Item 19).

a. On the USS Arkansas, the preservative was dried from all exposed outside surfaces but because of the paint on the parts of the feed mechanism very little rust was apparent. The grease coating was still in the bore and around the breech. Some flying object had struck the left Shell Retaining Ring (C-153596) bending it as seen in Fig. 196. The feed mechanism was functioned manually through a complete cycle and the firing pin operated.

b. On the USS Nevada the preservative oils were dried from all exposed outside surfaces but because of the paint no rust was apparent at first. Several days later, a great deal of rust formed on the various braces of the feed mechanism. The grease coating was still in the bore and around the breech. The piece was damaged beyond any immediate repair when the deck buckled under it from the effect of the bomb blast. The major damage consisted of the fracture of the right and left side Frames (D91130 and D91128). Two overall views of this damage are shown in Fig. 197 and Fig. 198. The break in the left side frame is shown in Fig. 199 while Fig. 200 shows the break in the right side frame. The mounting bolts holding the tube to the deck were also sheared. It is apparent that this mounting held long enough to cause the side frames to break. From the condition of the deck below the cannon, it is highly probable that very little destruction would have been caused had it been secured only at the trunnion and in the rear. In addition, the Left Tray Arm Connection Pin (B-301566) broke through at the cotter pin hole causing the Tray to break loose and hang at about a 45° angle. This may be seen in Fig. 201. The stop motion solenoid and main drive motor became thoroughly soaked from water on the deck and the electrical wiring was scorched, see Fig. 199. The rammer housing which is of light metal and can be straightened easily, was also spread open in the middle. It was impossible to change the firing selector due to the general disarrangement of the functioning parts. It was also impossible to operate the mechanism by hand. The firing motor would turn but the firing mechanism would not drop so it was not known whether the breech mechanism would operate. Considering the breakages listed above, it appears that the gun and its feed mechanism could be put in operating condition if replacement parts were available.

c. On the USS Pennsylvania, this gun received no damage whatever from the bomb explosion but suffered

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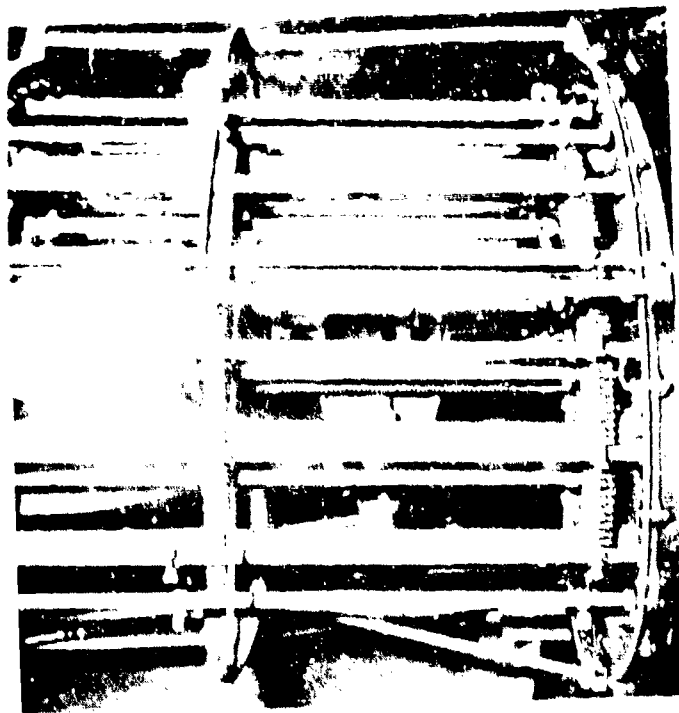


Fig. 196 - USS Arkansas - Gun, 75mm, AC, M10 -
Test Able damage.

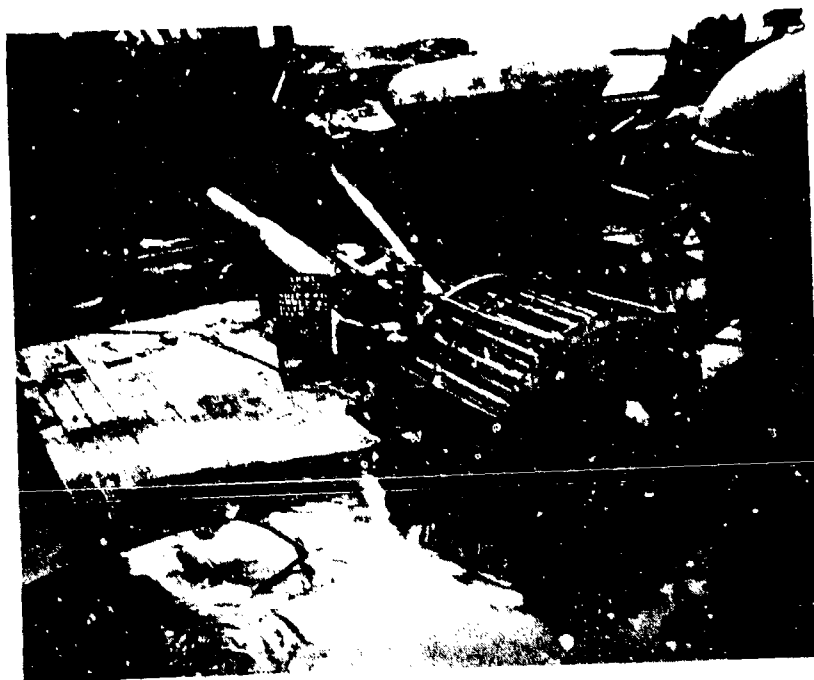


Fig. 197 - USS Nevada - Gun, 75mm, AC, M10 - Damage
from Test Able. Note condition of the deck
below the piece.

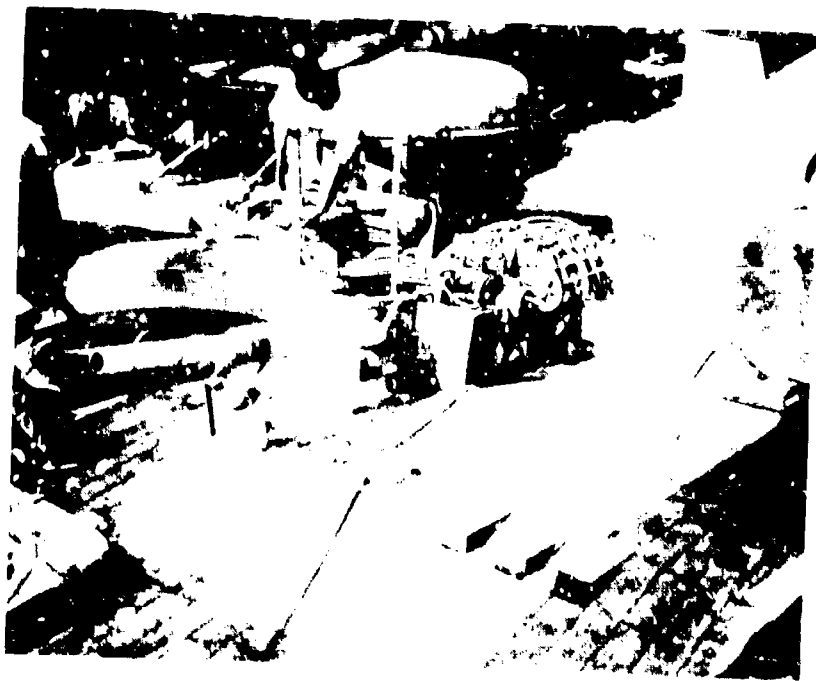


Fig. 198 - USS Nevada - Gun, 75 mm, AC, M10 - Damage from Test Able. Note condition of the deck below the piece.

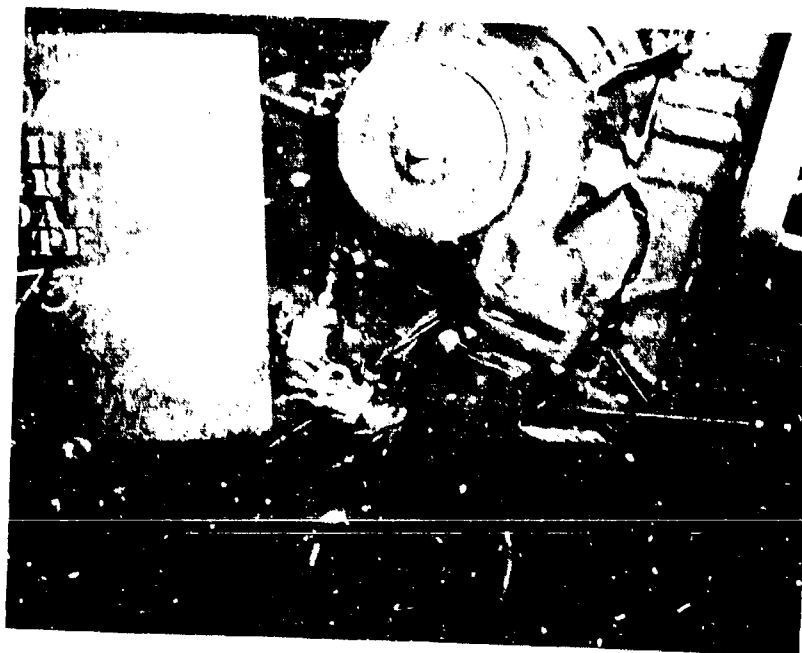


Fig. 199 - USS Nevada - Gun, 75 mm, AC, M10 - Broken left side frame.

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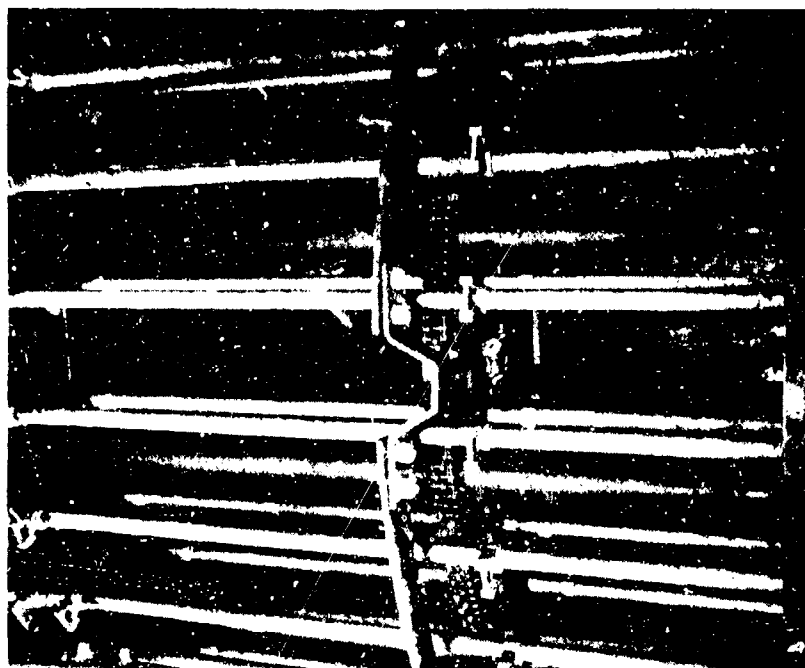


Fig. 201 - USS Nevada - Gun, 75mm, AC, M10 -
View showing broken loading tray.



Fig. 200 - USS Nevada - Gun, 75mm, AC, M10 -
Broken Right side Frame.

197
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secondary damage prior to the test, rendering it inoperative. A heavy boat was accidentally dropped on the gun hitting the left side of the feed mechanism a glancing blow. The feed was disassembled and the following parts were found bent out of shape:

- Rear magazine supporting bearing
- Shell spacing shaft, assy. (C153593) 3 each
- Left rear bracket brace (C153594)
- Shell retaining ring brace (D91123)
- Shell retaining ring (C153596)
- Indexing sprocket shaft (C153585)
- Front magazine supporting bracket (D91117)
- Rear magazine supporting bracket (D91118)
- Rammer shaft assy (C153587)

The following were found broken:

- Loading switch (A350273)
- Firing solenoid
- Shell guide rolls (A350070) 5 each

It was necessary to bend outward the magazine supporting brackets and spread them about 3/4" so the retaining ring brace could be reassembled. To assemble the indexing sprocket shaft, 1/32" had to be ground off the inside face of the sprocket shaft end inserts (B301612), as the taper pins would bind the movement of the shaft when inserted. The sprocket would not turn freely in its roller bearings but could be operated with a little force. The rammer shaft was out of line and would not center in the hole of the rear magazine supporting bracket. Operating by hand under excessive load caused the cams to wear and cracked the gate operating bracket assy. (C153592). This was brazed but did not reassemble correctly. The gate control is operative but the pin is out of line so that the lever cannot be set at "load". Metal shavings found in the lightening cuts on the rammer indicated that the rammer was rubbing on the front magazine supporting bearing. The feed was made to operate several cycles by hand but undue force had to be applied to the ratchet.

d. On the USS Saratoga this piece was unaffected by any force of the explosion and preservative coatings were in good condition. It was functioned through one cycle and found to be in perfect working order.

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18. Parachest M8A1 and Paracaisson, M9A2 (Items 20 and 21)

a. On the USS Arkansas the paracaisson, was lost and the parachest slightly damaged. It is believed that the damage was caused by the ship's heavy range finder which fell on deck and which may be seen in Fig. 202. The parachest was dented in several places but could be readily repaired.

b. The parachest was lost over the side on the USS Nevada. The force of the blast against the chest pulled loose the eye welded to the gun tub and the lashing was found wrapped around a brace and stretched its full length. The paracaisson was prevented from going over the side when it struck a stanchion. The force of the blow pulled off the wheel and axle assembly and ripped jagged holes in the body of the caisson where the bolts held the two assemblies in place. The hauling yoke was pulled free and was also bent. No damage was sustained by these items on the other two ships.

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Fig. 202 - USS Arkansas - General view showing range finder which struck paracaisson M9A2.

200
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E. AMMUNITION AND EXPLOSIVES.

1. Small Arms Ammunition

a. Cartridge, Ball, Cal..30, M2 (Item #1). Ten rounds of this item were displayed bare on a sheet metal plate, see Fig. 203.* On the YOG 83, Fig. 204, three rounds exploded, bursting the cartridge case out flat over a length from 1/4" to 1-1/2" behind the mouth of the case. The bullets from these rounds could not be found. One other case was bent at the neck about 15 degrees toward the blast. In no instance did the primers function. The other six rounds were still serviceable from the effects of the blast but were rendered unserviceable by later heavy corrosion of the case. The items on ships more distant from the blast received no damage.

b. Cartridge, Ball, Cal..30, M2 (Item #2). One hundred rounds were displayed in a metal belt, see Fig. 205. On the YOG 83, no blast effects were evident. The links were rusted and the rounds corroded. Rust was deposited where the metal tie-down strapping crossed the belt. On the LST 52, Fig. 206, the metal linkage was sprung by the blast rendering the belt unserviceable. No damage was noted on ships more distant from the blast.

c. Cartridge, Ball, Cal..30, M2 (Item #3). Two hundred-fifty rounds were displayed in a web belt, see Fig. 207. On the YOG 83, Fig. 208 and Fig. 204, the web belt was badly damaged by the blast and torn into three pieces. One piece containing 22 rounds was found 12 feet away from the remainder of the display. Some of the other rounds were blown out of the belt, ripping the cloth. Other rounds were blown partially out of the loops, tearing the webbing. One section, about 1 foot in length, had all rounds ripped out. The tab on the end nearest the blast was badly scorched and frayed. In one instance the cartridge case was in the belt, but the bullet was a few inches away from it. The powder was spilled in between. The bullets of five rounds had bent over the maximum about 45 degrees. One of these rounds remained in the belt while the others were loose

*The arrow shown in all ammunition photographs is pointed toward the bow of the ship.

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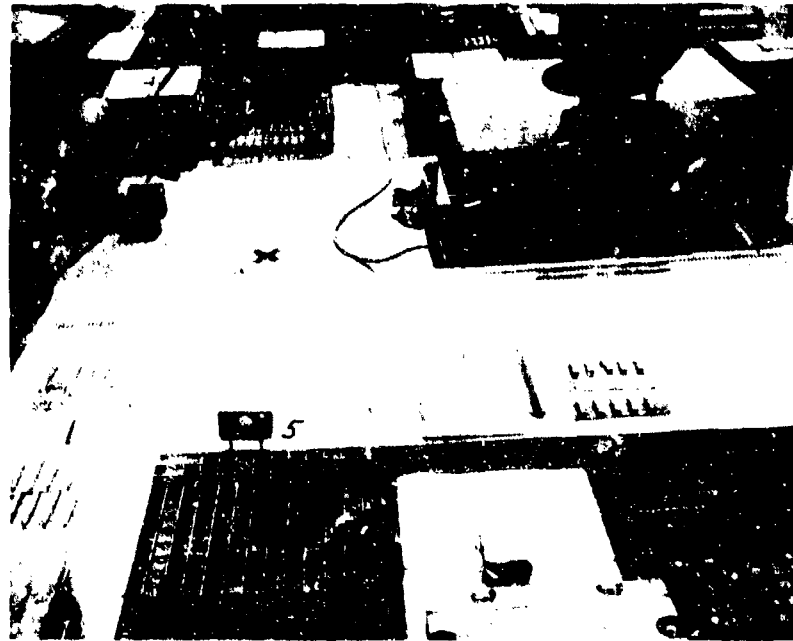


Fig. 203 - LST 52 - Method of securing Items 1 and 5.

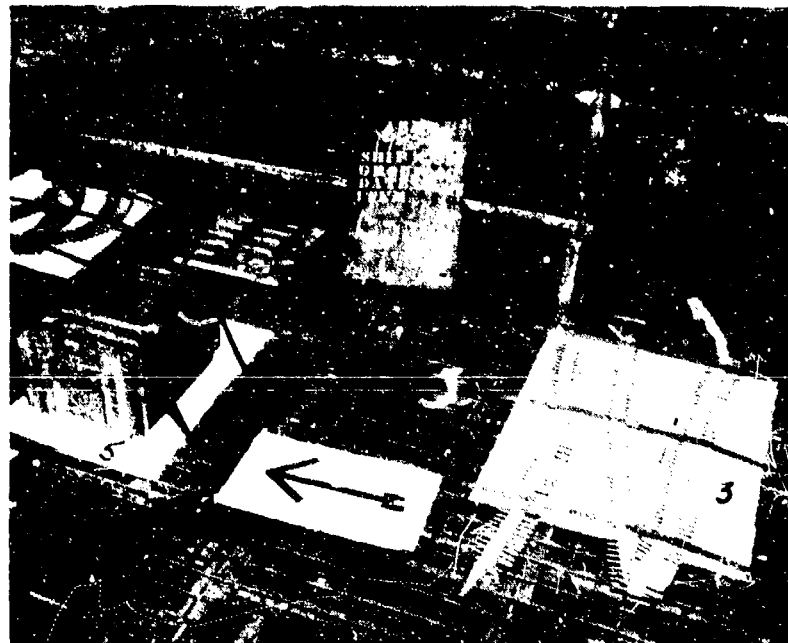


Fig. 204 - YOG 83 - Damage to Items 1, 3, and 5 after Test Able.

202
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Fig. 205 - LST 220 - Method of securing Items 2 and 5



Fig. 206 - LST 52 - Damage to Item 2 after Test Able.

203
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Fig. 207 - LST 661 - Method of displaying Item 3.

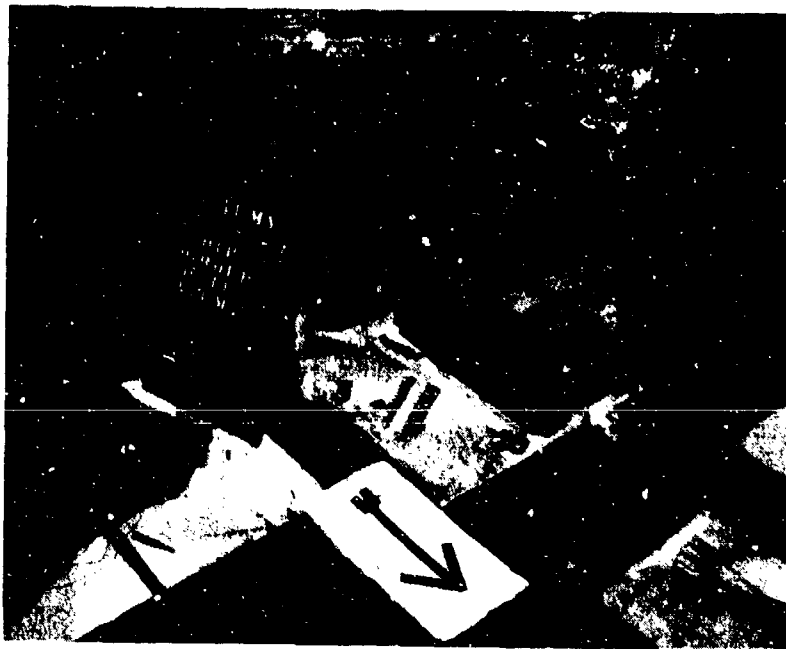


Fig. 208 - Y04 83 - Items 3 and 26 after Test Able

204
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within a radius of 10 feet from the display. Ten rounds were missing and presumed destroyed. All rounds were corroded and the belt was scorched in varying degrees. No damage resulted on the remaining ships.

d. Cartridge, Ball, Cal..30, M2 (Item #4). Twenty rounds were displayed in a cardboard carton, see Fig. 209. Even before Test Able, the carton on the YOG 83 had started to fall apart because of rain and had been taped together. After Test Able, the tape holding the carton together was scorched off by the blast. On the LST 52, the carton was crushed, split, and torn in attaching it to the pallet. It was shielded by Item #5 and received no damage from the bombing. No damage occurred on the other display ships.

e. Cartridge, Ball, Cal..30, M2 (Item #5). Two hundred forty rounds were displayed in a wood box on the YOG 83, LST 220 and LST 545, see Fig. 205. The box was removed and the rounds displayed in their metal can on the LST 52 and LST 661, see Fig. 203. On the YOG 83, Fig. 204, the box was scorched on the exposed surfaces by the blast, obliterating the markings on the end and side of the box. The top was lightly scorched but the markings were still legible. The hardware was scorched. The box was moved 1/8" by the blast. On the LST 52, the can was slightly scorched. On both the LST 52 and LST 661, the cans were dented in strapping the item to the display pallet. No other damage was evident.

f. Cartridge, AP, Cal..50, M2 (Item #6). Ten rounds of this item were displayed on a metal plate, see Fig. 210. On the YOG 83, Fig. 211, the cartridges were not damaged by the blast but were badly corroded. On all other ships no damage to the display items was apparent.

g. Cartridge, AP, Cal..50, M2 (Item #7). Fifty-five rounds were displayed in a metal belt. On the YOG 83, Fig. 212 and Fig. 211, one round was missing from the end away from the blast. Part of the metal belt was rusted. All cases were badly corroded. The right metal securing strap was broken by the blast. On the other ships there was no apparent damage.

h. Cartridge, AP, Cal..50, M2 (Item #8). Ten rounds were displayed in a cardboard carton, Fig. 210, Fig. 212, and Fig. 211. On the YOG 83, prior to Test Able, the carton had fallen open due to rain. After the test, the tape used to hold the carton together was torn and scorched and the markings on the carton were burned off by the heat of the blast. The carton had been badly

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Fig. 203 - LST 661 - Method of securing Item 4.

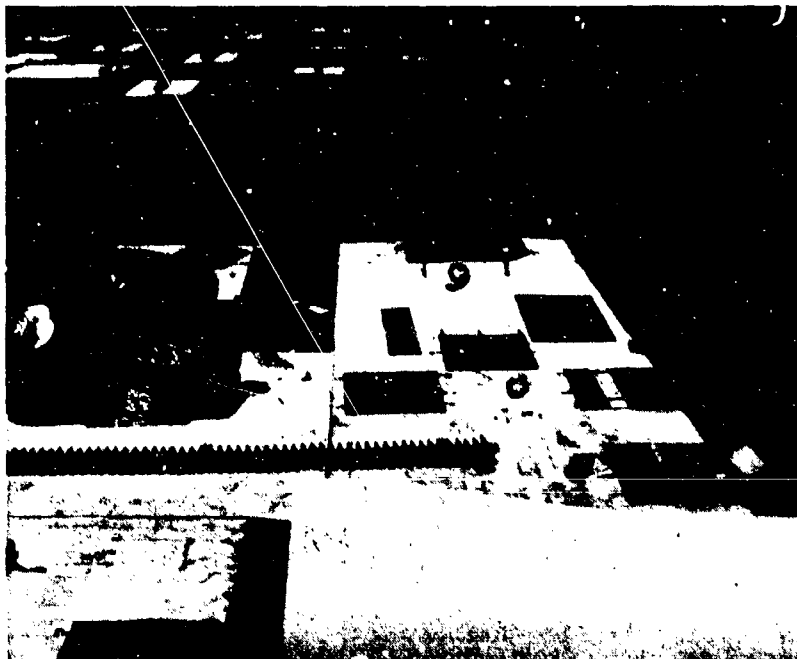


Fig. 210 - LST 661 - Method of securing Items
6, 8, and 9.

206
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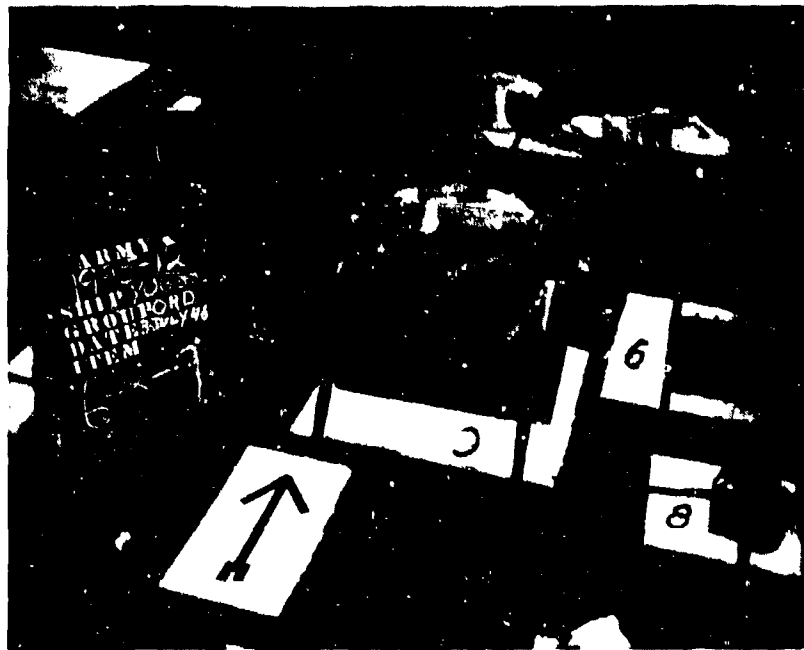


Fig. 211 - YOG 83 - Damage to Items 6, 7, 8, and 9 after Test Able.

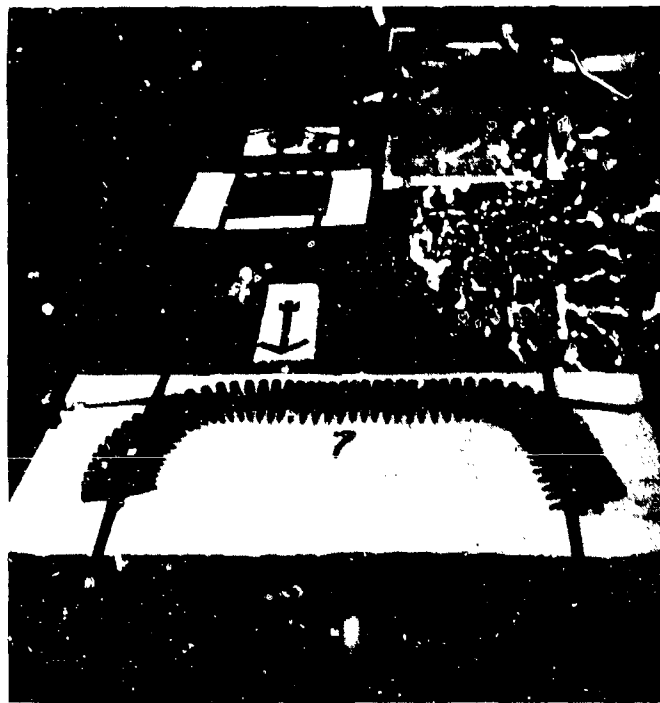


Fig. 212 - YOG 83 - Method of securing Item 7 to the display pallet.

207
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crushed while securing it to the pallet. On the LST 52, the carton was scorched on the side exposed to the blast, and masking marks made by the strapping were visible. The carton had been crushed and opened before Test Able. On the LST 661, the carton was only slightly scorched by the heat from the blast. The carton had been damaged by rain before Test Able. On the LST 220 and LST 545, there was no apparent damage.

i. Cartridge, AP, Cal..50, M2, (Item #9). Two hundred sixty five rounds were displayed in a box, see Fig. 210. On the YOG 83, Fig. 211, the box was scorched on the end and side but the top was only 1/3 scorched. Because of the scorching, the nomenclature on the end and side was extremely difficult to discern. The markings on the top were legible. The wing nuts were discolored by scorching. The box was moved diagonally 1" away from the blast. On the LST 52, the box was scorched on the blast side except where masked by a vent pipe. On the LST 661, the box was slightly scorched by heat from the bomb on the side exposed directly to the blast. All markings, however, were still plainly visible. On the LST 220 and LST 545, there was no apparent damage.

j. Cartridge, Tracer, Cal..50, M10 (Item #10). Ten bare rounds were displayed on a metal plate. On the YOG 83, Fig. 213, the rounds were not damaged by the blast, but some were badly corroded by the atmosphere. On the LST 52, this item was masked by Item #13. On the remaining ships there was no apparent damage.

k. Cartridge, Tracer, Cal..50, M10 (Item #11). Fifty rounds were displayed in a metal belt, see Fig. 214. On the YOG 83, the cartridges were not damaged by the blast but the cases were corroded and the links rusted from exposure. The item was still serviceable on the remaining ships.

l. Cartridge, Tracer, Cal..50, M10 (Item #12). Ten rounds were displayed in a cardboard carton. On the YOG 83, the carton had fallen apart from exposure but was taped together prior to the test. After Test Able, Fig. 215, the carton was still intact but part of the markings were scorched. The rounds were not damaged. On the LST 52, the carton was masked by Item #13. The carton had been crushed before Test Able by the securing straps. On the remaining target vessels there was no apparent damage.

m. Cartridge, Tracer, Cal..50, M10 (Item #13). Three hundred fifty rounds were displayed in a box,

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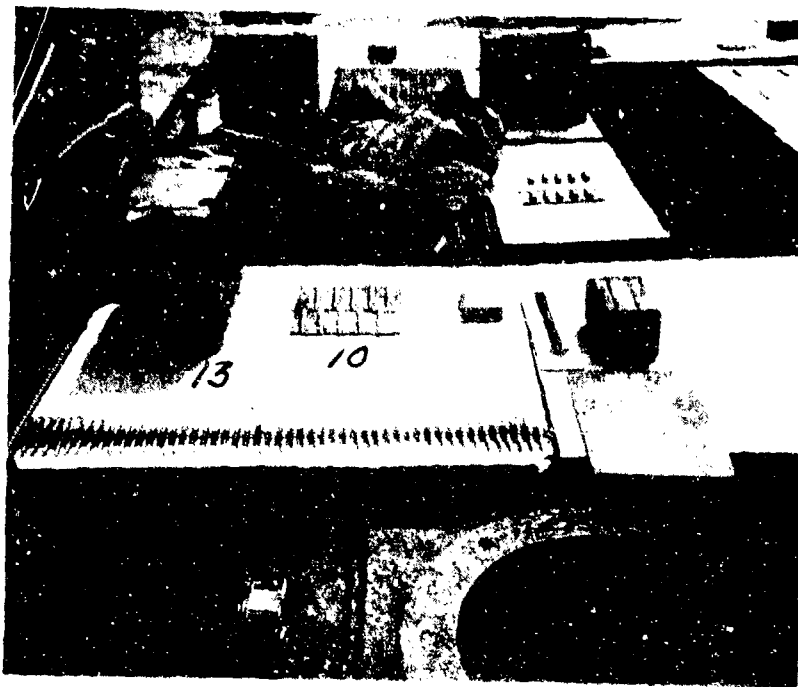


Fig. 213 - LST 52 - Method of securing Items 10 and 13.

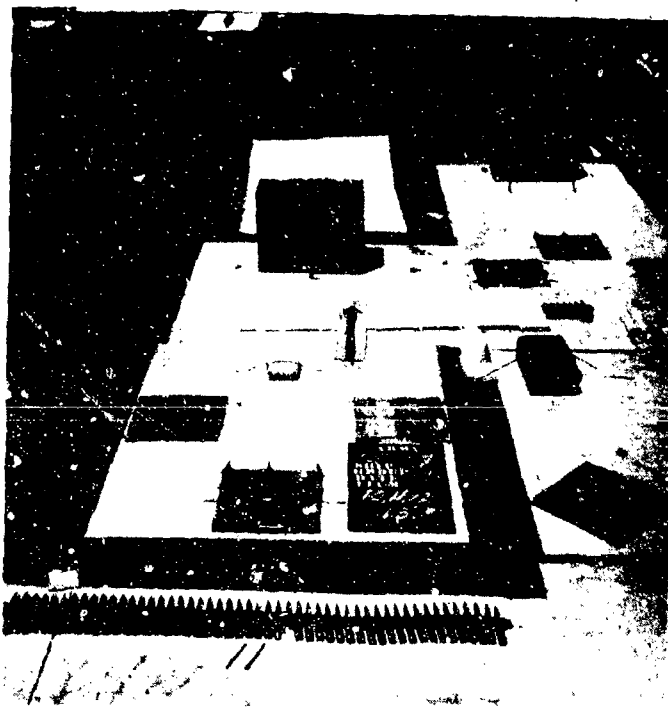


Fig. 214 - LST 561 - Item 11, as displayed before Able Day.

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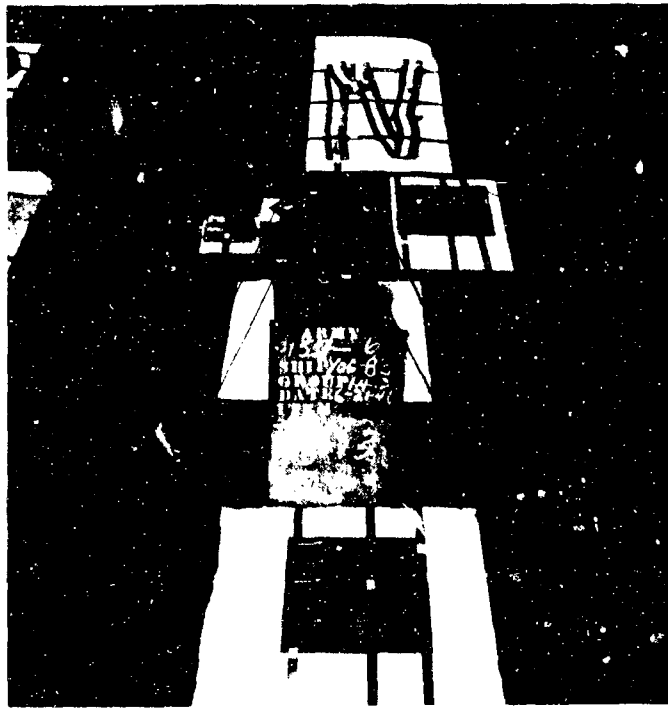


Fig. 215 - YOG 83 - Method of securing Item 12.

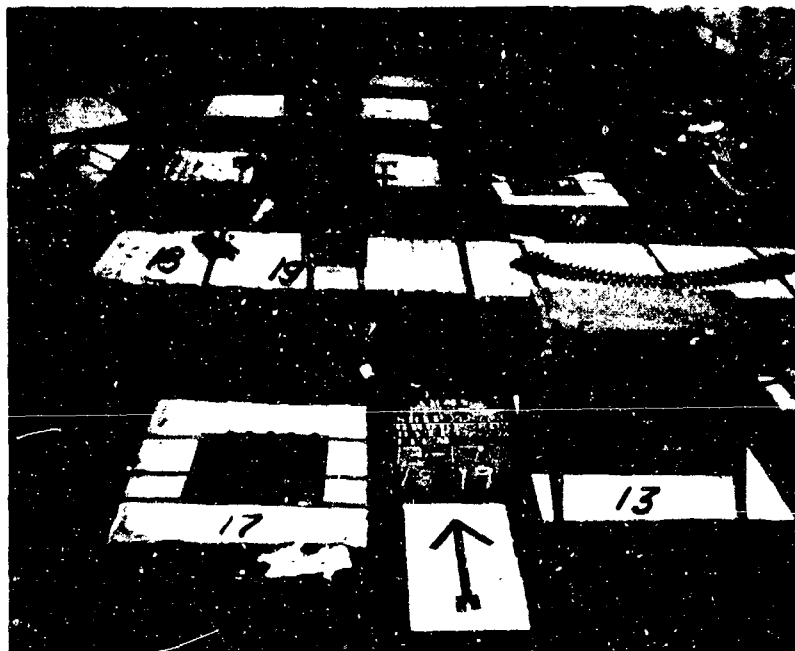


Fig. 216 - YOG 83 - Damage to Items 13, 17, 18, and 19, after Test Able.

210
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Fig. 213. On the YOG 83, after Test Able, Fig. 216, all markings on the front and end of the box were slightly scorched and the hardware was rusted. The box was moved away 1" and to the right 1/4" by the blast. On the LST 52, the box was scorched on the side exposed to the blast except on the portions which were masked by a vent pipe. On the LST 661, the box was scorched on the side exposed directly to the blast. All markings on this side of the box were obliterated. On the remaining target vessels, there was no apparent damage.

n. Shell, Shotgun, all brass, 12-gauge, No. 00 Buck, M19 (Item #14). Ten bare rounds were displayed on a sheet metal plate, Fig. 217. On the YOG 83, all rounds were corroded. In one round the wadding was pushed back by the blast and was loose from the crimping but no other damage was apparent. On the LST 52, this item was displaced 5 degrees in azimuth. One shell had moved backward under the wire securing it to the pallet. On the other vessels, there was no apparent damage.

o. Shell, Shotgun, all brass, 12-gauge No. 00 Buck, M19 (Item #15). Twenty-five rounds were displayed in a cardboard carton, see Fig. 218. The waterproof paper on the carton was slightly scorched on the YOG 83, Fig. 219 and a small hole was scorched in the paper to a depth of one layer in the corner. On the LST 52, Fig. 220, the outer covering on the package was burned in two spots over an area approximately 3/4" x 1", and the foil wrapping was torn open. On the remaining vessels no damage was apparent.

p. Shell, Shotgun, all brass, 12-gauge, No. 00 Buck, M19 (Item #16). A box containing 120 rounds was displayed, Fig. 221. As no shotgun shell box was available on the YOG 83, a Cal..50 ammunition box was used, see Fig. 217. The paint on the side of the box was discolored by heat. On the LST 52, the box was scorched on the side exposed to the blast, except where masked by the tie-down straps. On all remaining ships, no damage was apparent.

q. Shell, Shotgun, 12-gauge, #8, C.S. (Paper) (Item #17). Ten rounds were displayed bare on a sheet metal plate, Fig. 222. On the YOG 83, Fig. 216, one layer of paper was scorched through on the right side of the shell. The scorch was about 3/8" wide for the length of the shells. On the LST 52, Fig. 223, the paper shells were distorted and scorched, and were unserviceable. The plate on which the items were displayed was bent up on the forward and after ends by the blast. On the re-

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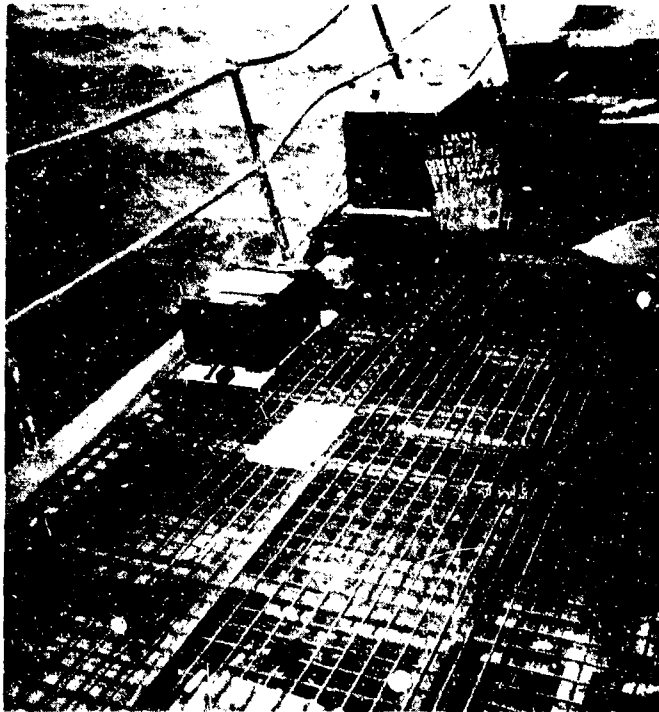


Fig. 217 - YOG 83 - Method of securing
Items 14, 16, and 124.

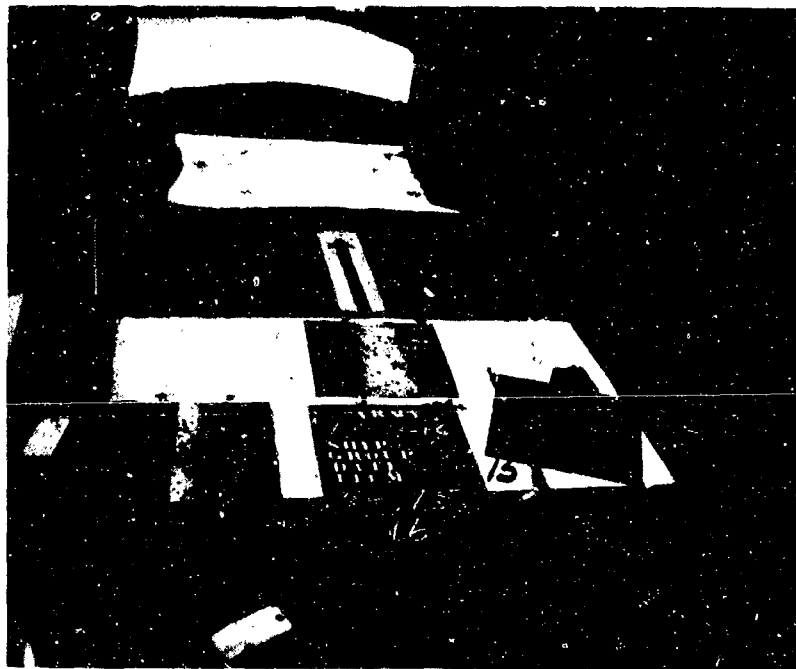


Fig. 218 - LST 661 - Method of securing Item 15.

212
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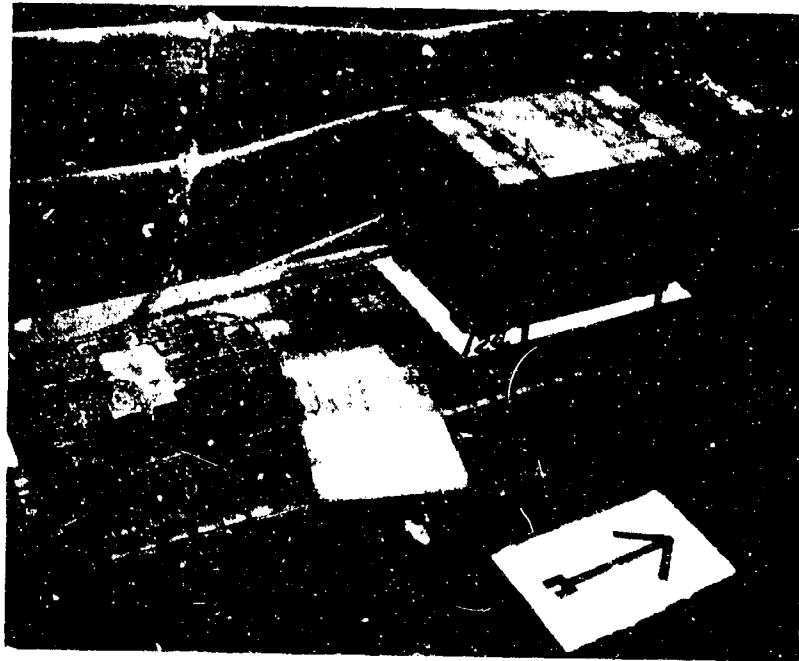


Fig. 219 - YOG 83 - Damage to Items 15 and 124 after Test Able.



Fig. 220 - LST 52 - Damage to Item 15 after Test Able.

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Fig. 222 - LST 52 - Method of displaying Item 17.

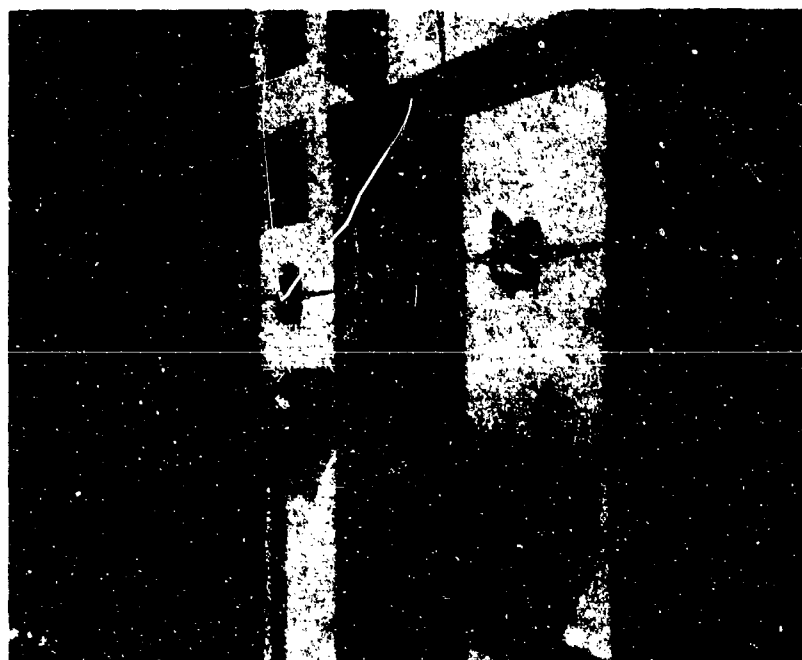


Fig. 221 - LST 52 - Method of displaying Item 16.

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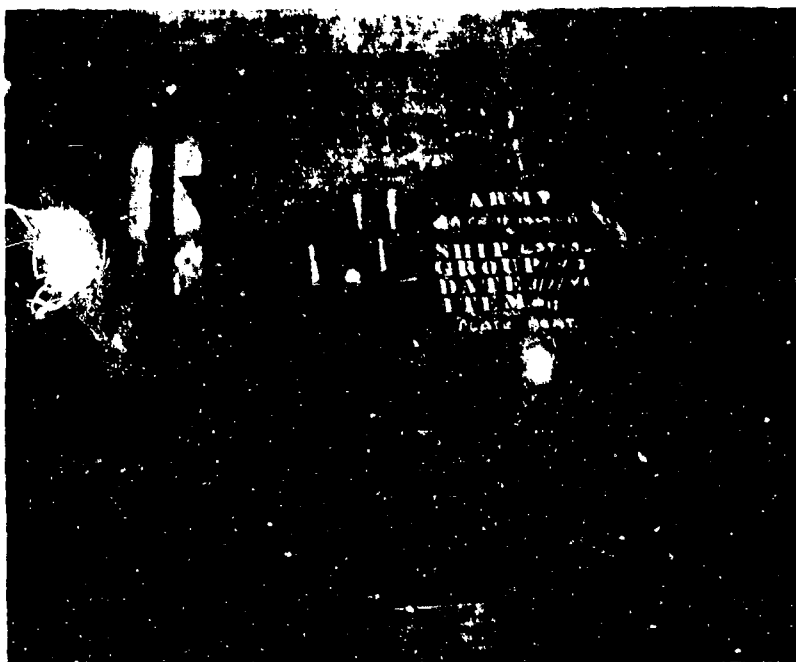


Fig. 223 - LST 52 - Damage to Item 17 after Able Test.

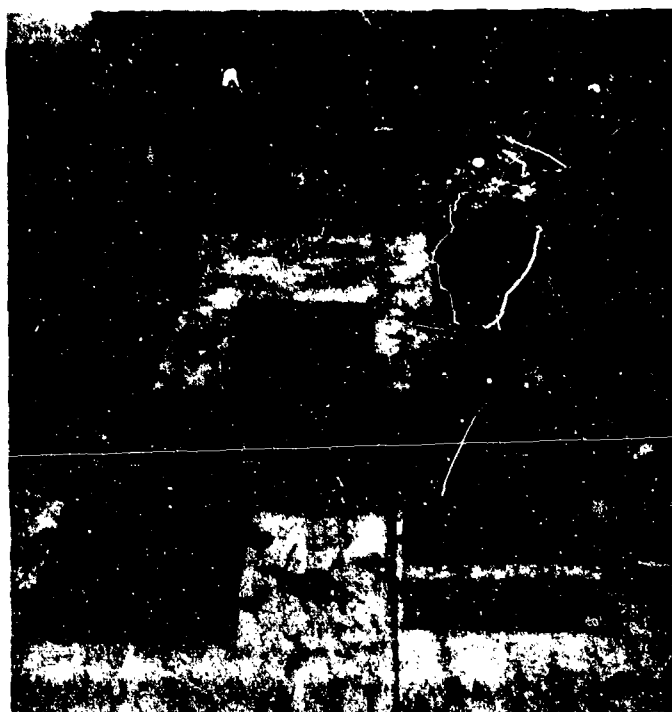


Fig. 224 - LST 662 - Item 18 displayed on
a sheet metal plate.

215
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maining ships, no damage was apparent.

f. Shell, Shotgun, 12-gauge, #8, C.S. (Paper) (Item #18). Ten rounds were displayed in a cardboard carton, see Fig. 224. On the YOG 83, Fig. 225 and Fig. 216, the carton fell apart from exposure to the rain. It was also slightly scorched by the blast, but the shells inside were not damaged. On the LST 52, the carton was scorched on the side exposed to the blast. It had been crushed by the metal securing straps. After the test, the carton was loose under the straps and had moved approximately 12" to the right. The asbestos on which these shells were displayed was completely gone. On the remaining target vessels, no damage was apparent.

g. Shell, Shotgun, 12-gauge, #8, C.S. (Paper) (Item #19). One hundred twenty rounds were displayed in a metal can, Fig. 225. On the YOG 83, Fig. 216, the can was badly dented in securing it to the pallet, making it unserviceable for further use. After Test Able the can was badly scorched on the end, on the side, and slightly on the top, partially obliterating the marking. Asbestos was spattered on the side and end away from the blast. On the LST 52, the can was dented by a foreign object. There was no other damage evident except a slight scorching on the side exposed to the blast. On the remaining three ships, no damage was apparent.

h. Cartridge, Ball, Cal..45, M1911 (Item #20). This item was displayed in two 7-round clips, see Fig. 226. On the YOG 83, before Test Able, the clips were rusted, Fig. 227. After Test Able, both the clips and the cases were corroded, especially around the mouth of the case. The rounds showed no visible damage from the blast. On the LST's 52 and 661, the undamaged clips were rusty due to exposure. On the remaining ships, no damage was apparent.

i. Cartridge, Ball, Cal..45, M1911 (Item #21). Fifty rounds were displayed in a cardboard carton, Fig. 226. The carton was slightly crushed in strapping it to the pallet, on the YOG 83, and was breaking open because of rain, Fig. 227 and Fig. 228. The carton was retaped before the test. After Test Able the three sides facing the blast were so badly scorched that the carton broke open and spilled the cartridges onto the pallet. The markings had been scorched off but the cartridges were not affected. Before Test Able, the carton had been crushed in strapping it to the pallet on the LST 52. After Test Able the carton was scorched by the

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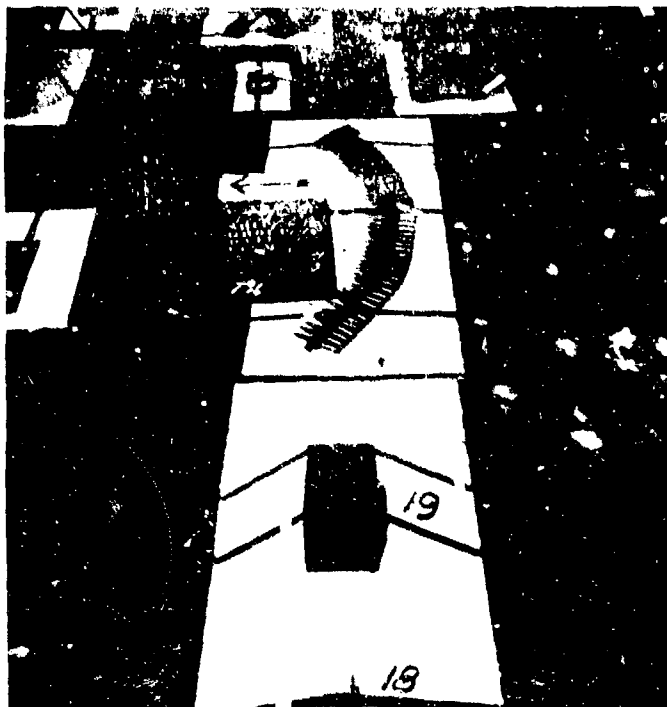


Fig. 225 - YOG 83 - Method of displaying
Items 18 and 19.

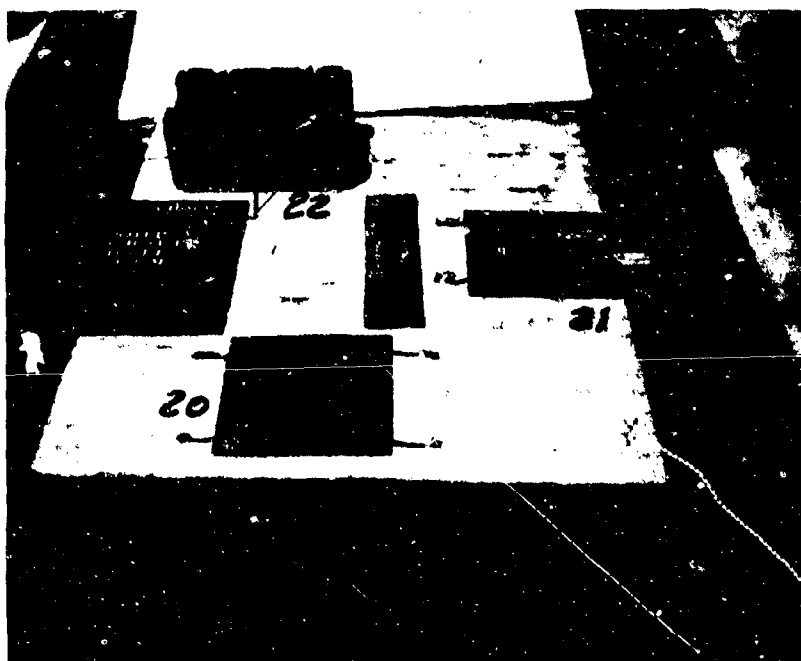


Fig. 226 - LST 661 - Method of securing Items
20, 21, and 22.

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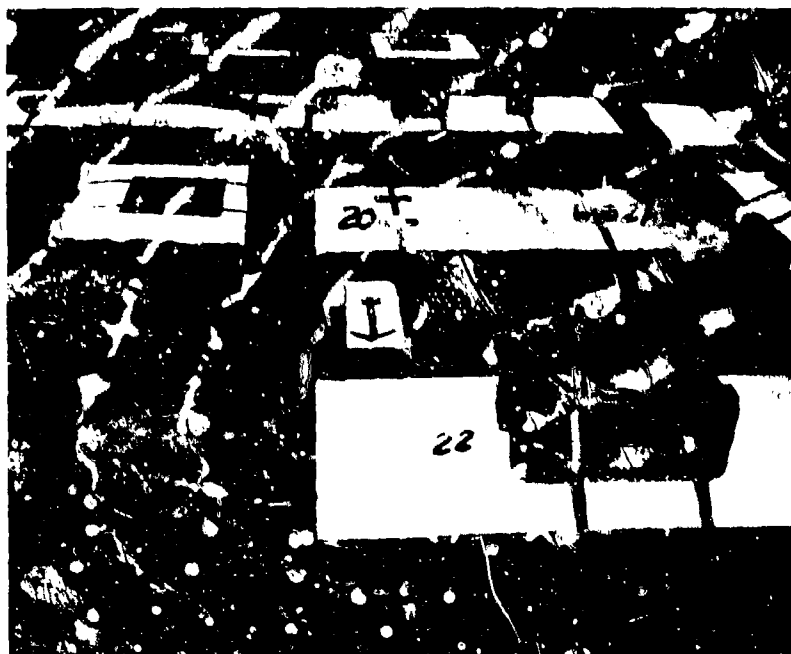


Fig. 227 - YOG 83 - Method of displaying Items 20, 21, and 22.



Fig. 228 - YOG 83 - Damage to Items 21, 39, and 40 after Test Able.

218
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bomb on the side nearest the blast. The carton on the LST 661 was slightly scorched by the heat from the blast. There was no damage sustained on the other two ships.

V. Cartridge, Ball, Cal..45, M1911 (Item #22). Six hundred rounds were displayed in a box, see Fig. 226. On the YOG 83, Fig. 227 and Fig. 229, there were CROSSROADS markings that obliterated some of the original stencilling. These markings were scorched off on the end and side facing the blast. The box was also scorched on the top. On both the LST's 52 and 661, the box was scorched on the side exposed directly to the blast. All markings on this side of the box were obliterated. No damage was sustained on ships more distant from the blast.

W. Cartridge, Incendiary, Cal..50, M23 (Item #186). Ten rounds were displayed bare on a sheet metal plate, see Fig. 230. There was no damage sustained on any of the ships, except the YOG 83. The rounds there were badly corroded by rain.

X. Cartridge, Incendiary, Cal..50, M23 (Item #187). Sixty rounds were displayed in a metal belt, see Fig. 230. Six rounds on the YOG 83 were blown partially out of the links. The ends of the belt were blown out from under the strapping and the rounds were badly corroded. No damage was sustained on the other target ships.

Y. Cartridge, Incendiary, Cal..50, M23 (Item #188). Ten rounds were displayed in a cardboard carton, see Fig. 230. Before Test Able, on the YOG 83, the carton had been taped to keep it from falling apart. After the burst there was a slight scorch on one corner, but the tape was undamaged. On the LST 52, the carton was crushed by the straps. After Test Able, on both the LST's 52 and 661, the carton was scorched on the blast side and markings were obliterated. No damage was apparent on the other target ships.

Z. Cartridge, Incendiary, Cal..50, M23 (Item #189). One hundred-twenty rounds were displayed in a wood box, Fig. 230. The box was slightly scorched on the side and end nearest the blast, on the YOG 83. No markings were obliterated. The hardware was slightly scorched. The box was moved diagonally 3/4". On the LST 52, the box was scorched on the blast side, the markings were illegible and mark marks made by the straps could be seen. On the LST 661, the box was slightly scorched, but the markings were still legible. There was no apparent damage on the LST's 220 and 545.

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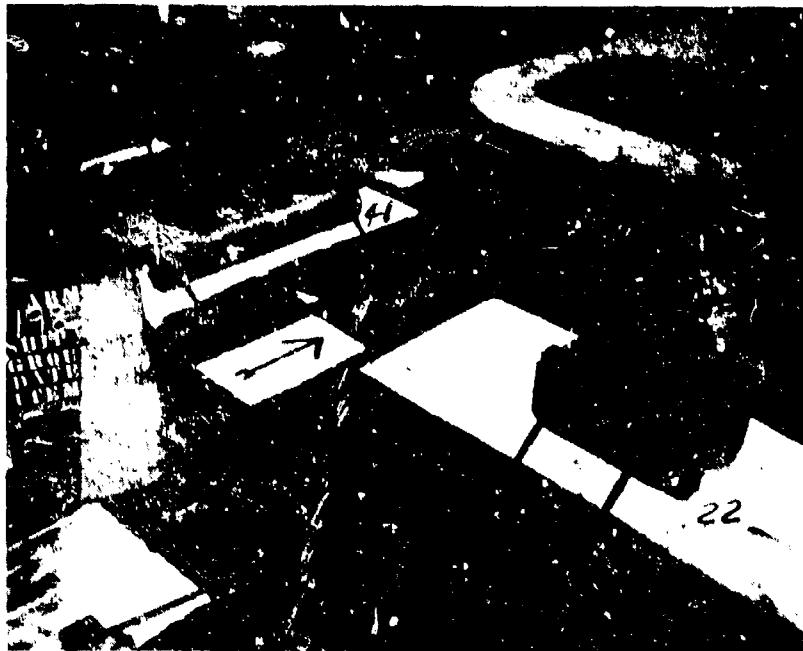


Fig. 229 - YOG 83 - Damage to Items 22 and 41 after Test Able.

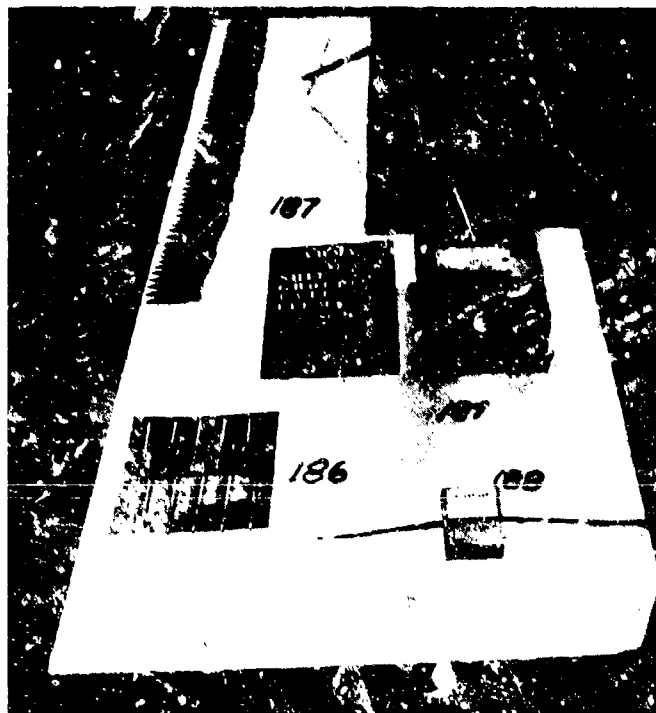


Fig. 230 - LST 52 - Method of securing Items 186, 187, 188, and 189.

220
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2. Artillery Ammunition:

a. Cartridge, TP, M99, (T24) 20mm AC Guns (Item #25). Five rounds were displayed here, see Fig. 231. On the YOG 83, the annulus of the primer showed scorching and the rounds had been corroded from exposure. On the other ships, there was no apparent damage.

b. Cartridge, TP, M99, (T24) 20mm AC Guns (Item #26). One hundred-ten rounds were displayed in a box, see Fig. 231. On the YOG 83, Fig. 232 and Fig. 208, the box was partially shielded by a stanchion 1-1/4" in diameter. The nomenclature on the blast side was partially obliterated by scorch, but that shielded by the stanchion remained legible. The box was also scorched on an end and the top as well as on the rope handle exposed to the blast. The box moved 1/2" to the right and 1/4" back. On the LST 661, the box was slightly scorched on the side exposed to the blast. The markings were still legible. No damage was reported on the LSTs 545 and 230.

c. Cartridge, TP, M306 (T23) w/Fuse, Dummy, T126 for 57mm Rifle (Item #27). One cartridge was displayed here, Fig. 233. On the YOG 83, Fig. 234, the varnish on the cartridge case was softened by the sun. After Test Able the varnish had been scorched off the case on the side nearest the blast. The propellant had burned in the case but the primer had not functioned. It was impossible to determine if an internal change had taken place. Part of the paper liner was burned away on the side nearest the bomb explosion. The round did not change its position during the blast. The base of the cartridge case was not scorched. On the LST 52, Fig. 235 and Fig. 236, the propellant had also burned. The paper shell containing the propellant was approximately half burned away on the side facing the blast. The primer was still intact and showed no evidence of burning. On the LST 661, the paper liner of this case was scorched on the side directly exposed to the blast. One layer of paper liner was burned through in one place at the projectile end of the case. The powder charge was not exposed and apparently was not damaged. On the remaining ships, the LST 230 and LST 545, no damage was apparent.

d. Cartridge, TP, M306 (T23) w/Fuse, Dummy, T126 for 57mm Rifle (Item #28). One round was displayed in a metal container, see Fig. 237. On the YOG 83, Fig. 238 and Fig. 239, the paint on this item was scorched off on the side facing the blast. It appeared to have been partially scorched and partially blown off. The model

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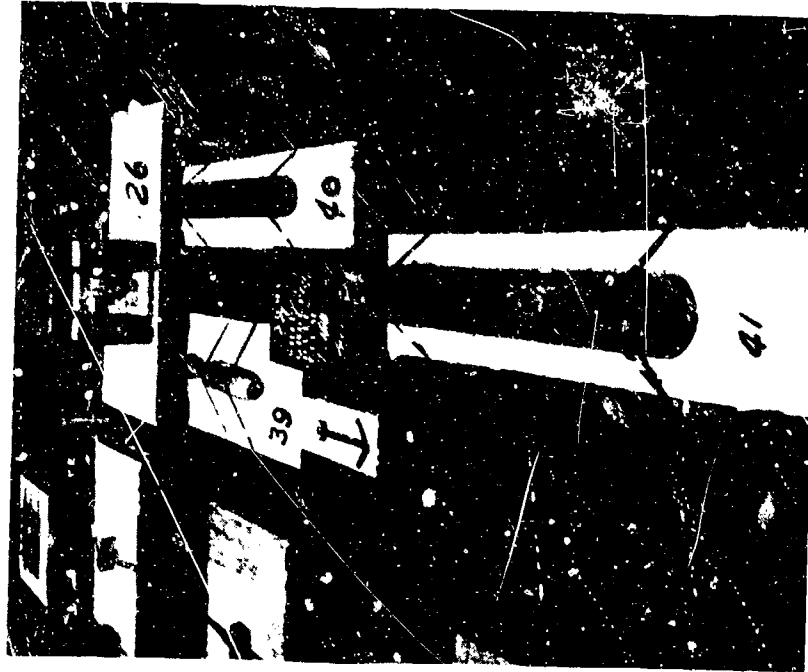


Fig. 233 - YOG 83 - Method of securing
Items 26, 39, 40 and 41.

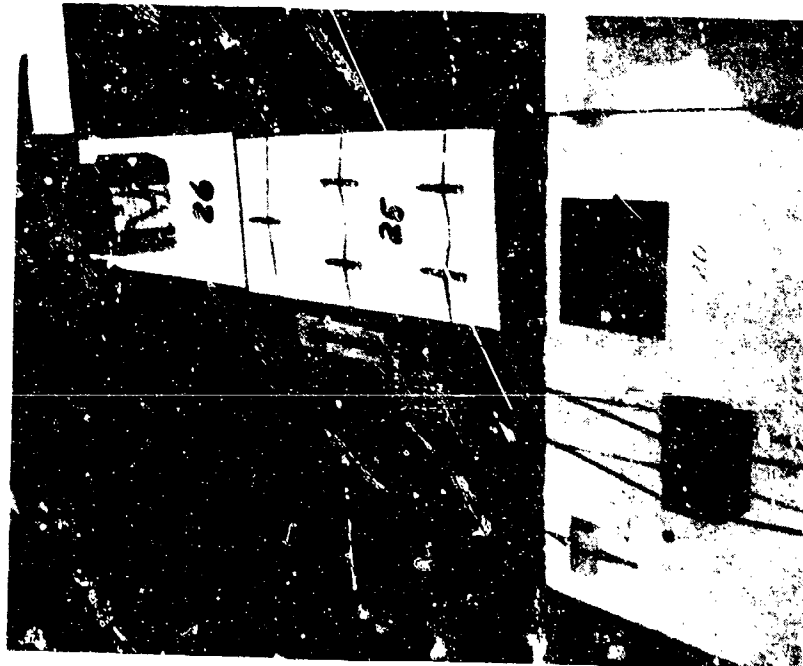


Fig. 231 - LST 52 - Method of displaying
Items 25 and 26.

222
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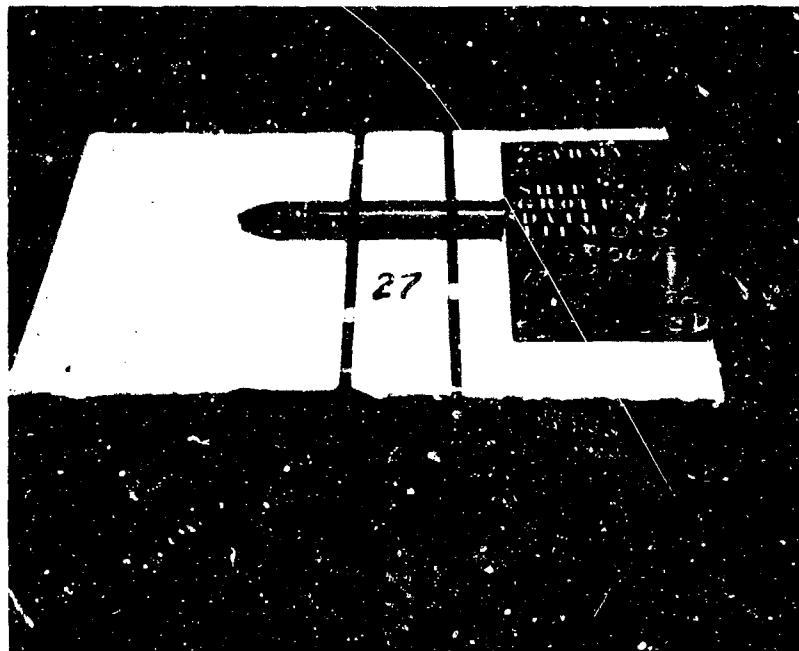


Fig. 233 - LST 220 - Method of securing Item 27.

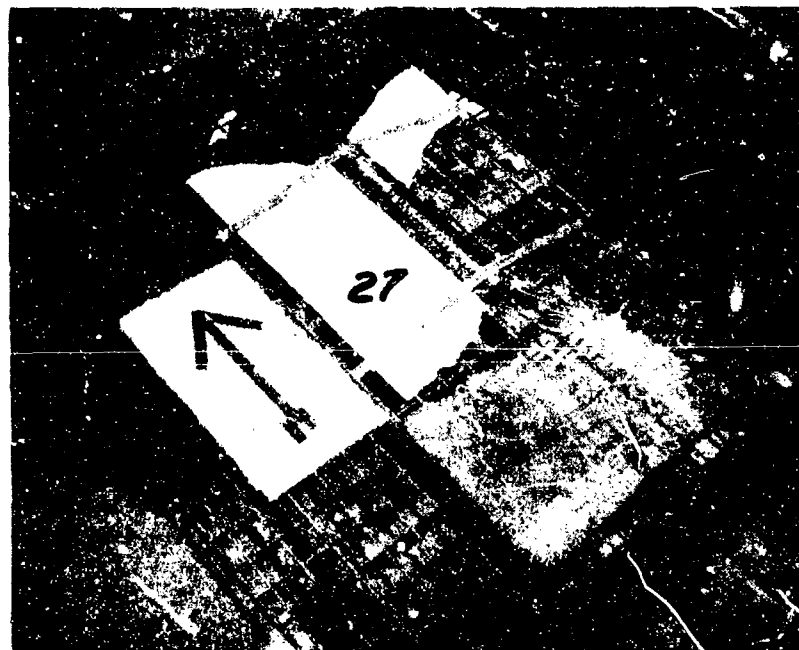


Fig. 234 - YOG 83 - Damage to Item 27 after Test Able.

223
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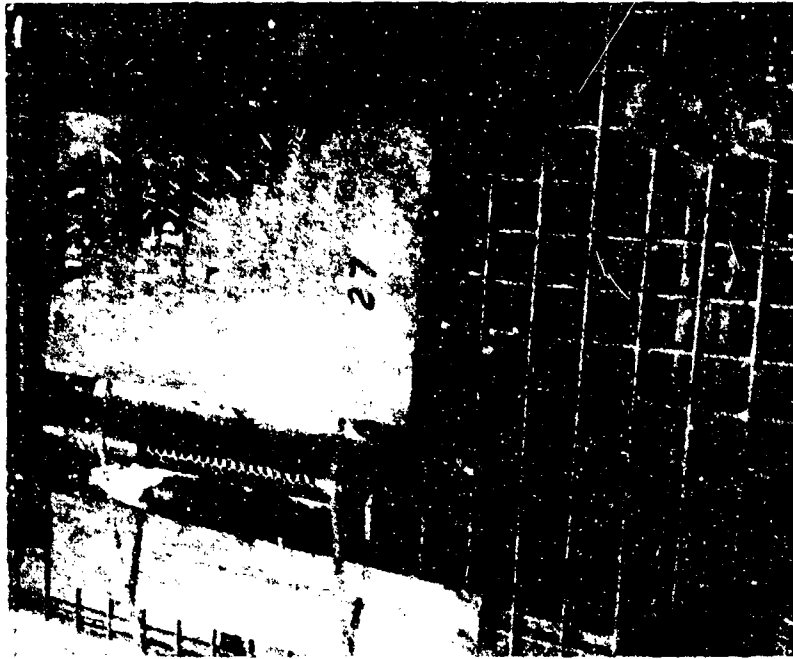


Fig. 236 - LST 52 - Damage to Item 27
after Test Able.

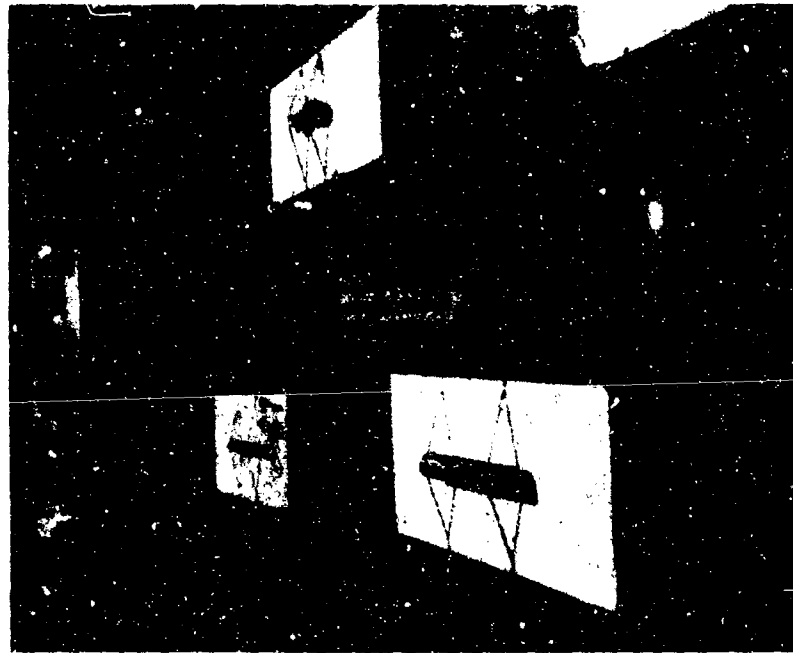


Fig. 235 - LST 52 - Method of displaying
Item 27.

224
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Fig. 237 - LST 545 - Method of securing Items 28, 35, and 40.

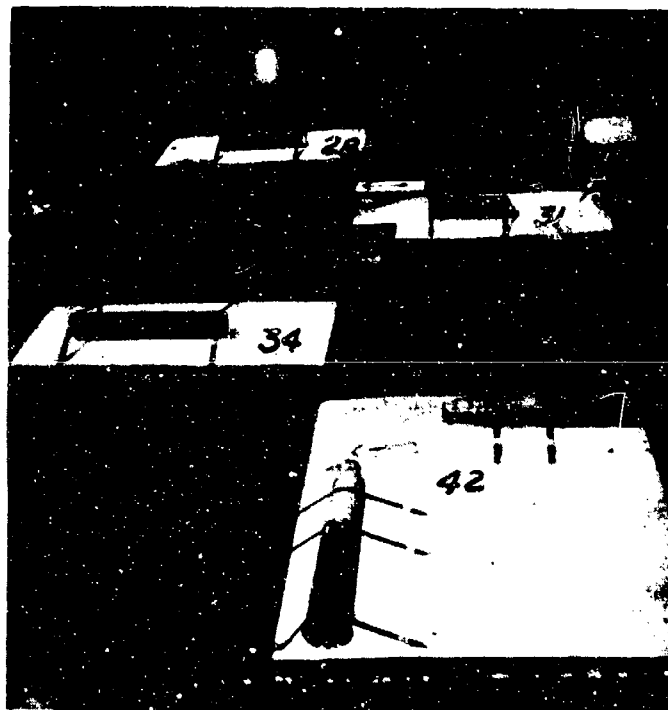


Fig. 238 - YOG 83 - Method of display and arrangement of Items 28, 31, 34, and 42.

225
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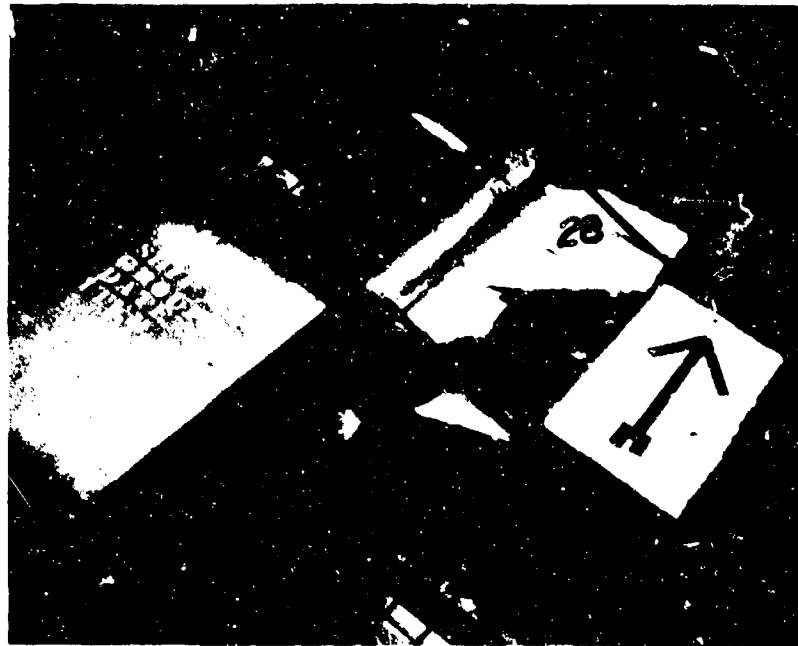


Fig. 239 - YOG 83 - Damage to Item 28 after Test Able.



Fig. 240 - LST 52 - Damage to Item 28
after Test Able.

226
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number marking was gone. On the LST 52, Fig. 240, the strapping was broken on the item. The container was dented by the strapping process and was also slightly scorched. On the remaining vessels, there was no apparent damage.

2. Cartridge, TP, M306 (T22) w/Fuse, Dummy, T126 for 57mm Rifle (Item #29). Two rounds were displayed in their wooden box, Fig. 241. On the YOG 83, Fig. 242, the box was displaced 1/2" by the blast. The wood was scorched and slightly charred on the exposed sides and the top. The rope handle was also scorched. The nomenclature was too badly scorched to be legible on the end of the box. This box had been restencilled before display and the old nomenclature was showing through the new on the side away from the blast. The hardware was corroded and scorched on the right side. The ammunition was apparently in good condition inside the box. On the LST 52, the box was scorched on the blast side. On the LST 661, the box was slightly scorched but the markings remained legible. This item was partially masked toward the bow on the LST 661. On the remaining two vessels, there was no apparent damage.

3. Shell, HE (1t) M43A1, w/o Fuse, 81mm Mortar, (Item #30). One round was displayed here, see Fig. 243. On the YOG 83, Fig. 244 and Fig. 245, the nose plug and adapter were rusty before Test Able. The powder increments had broken down under the sun and sea water. The increments on the right side were ignited by the bomb burst. Those on the left side were blown away. The ignition cartridge was still serviceable. The wire clips for the increments were in place but scorched. A small piece of one increment was still in position under one clip. The round was moved to the left 1/8" and the base moved 1" to the right of the old position. The shell body was slightly rusted, but the marking was in good condition. On the LST 52, Fig. 246, the propellant was destroyed. The primer was intact and the ignition cartridge had functioned. The cardboard container was slightly scorched. The clips holding the propelling charges had rusted before Test Able. On the LST 661, the increments had burned, apparently having been ignited by heat from the bomb, but the ignition cartridge was undamaged by either the blast or the burning of the increments. On the LST 220 and the LST 545, there was no apparent damage.

4. Shell, HE (1t) M43A1, w/o Fuse, 81mm Mortar (Item #31). One round was displayed in a fiber container

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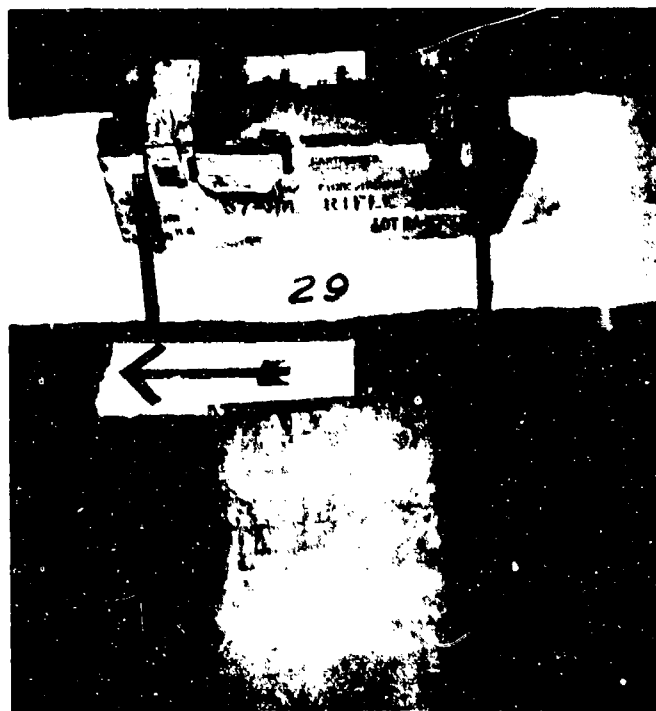


Fig. 241 - YOG 83 - Method of displaying Item 29.

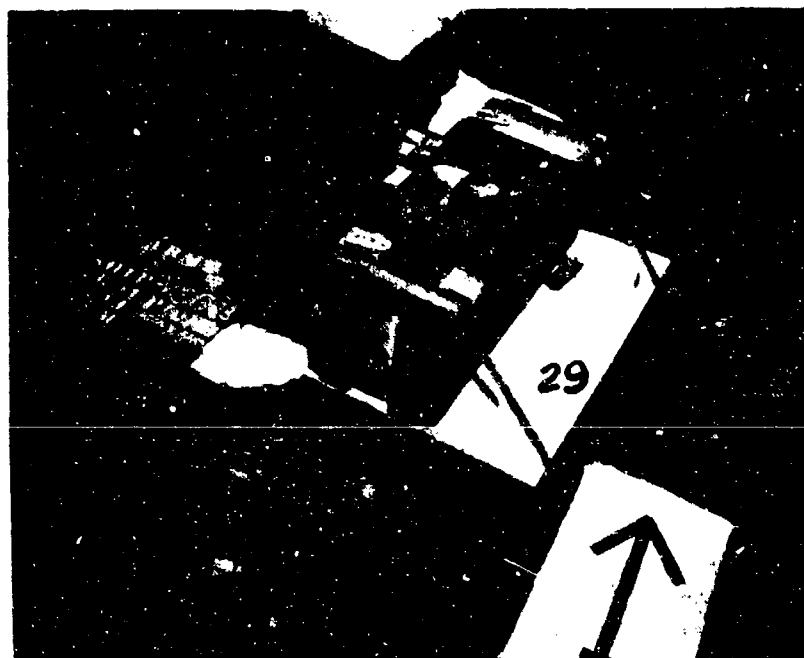


Fig. 242 - YOG 83 - View of scorched and charred surfaces of Item 29 after Test Able.

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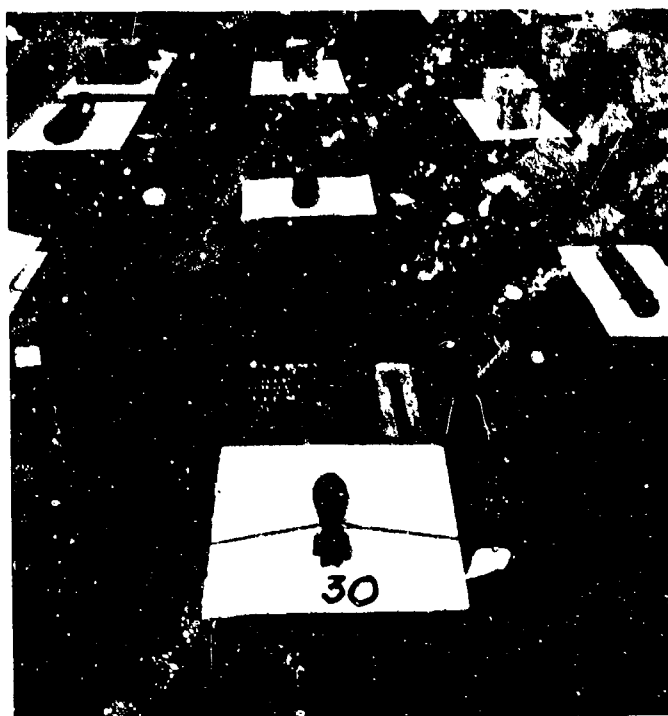


Fig. 243 - LST 661 - Method of securing Item 30.

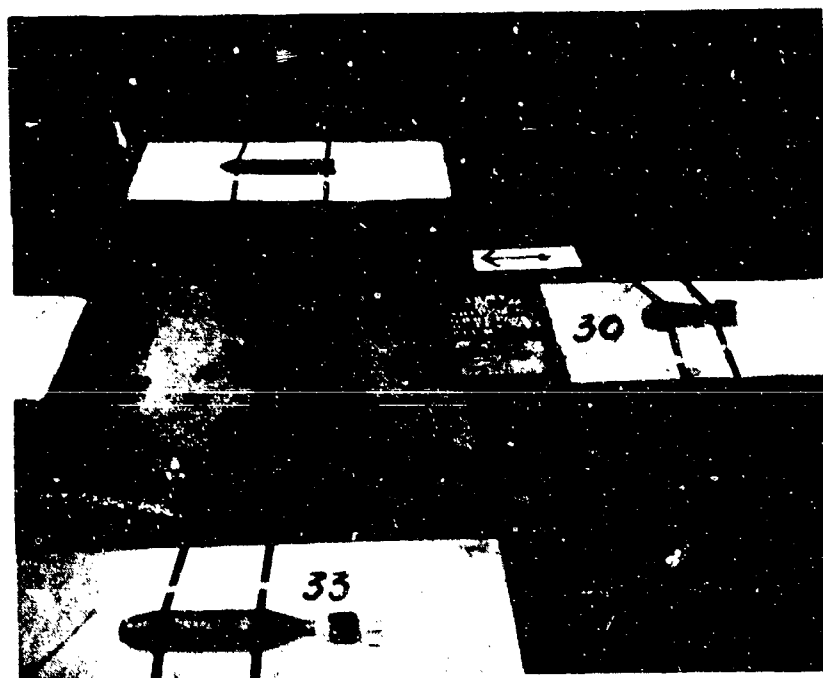


Fig. 244 - YOG 83 - Method of securing Items 30 and 33.

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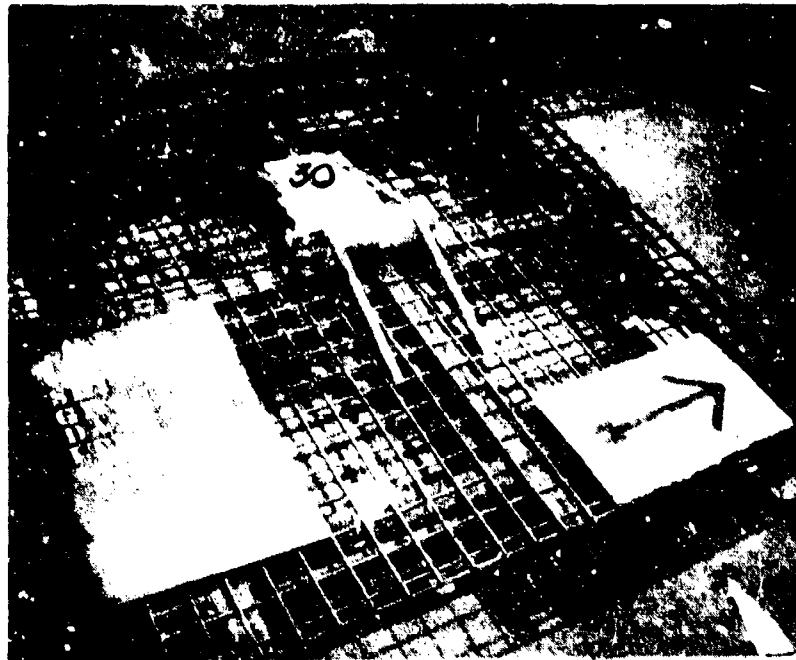


Fig. 245-YOG 83 - Damage to Item 30 after Test Able.

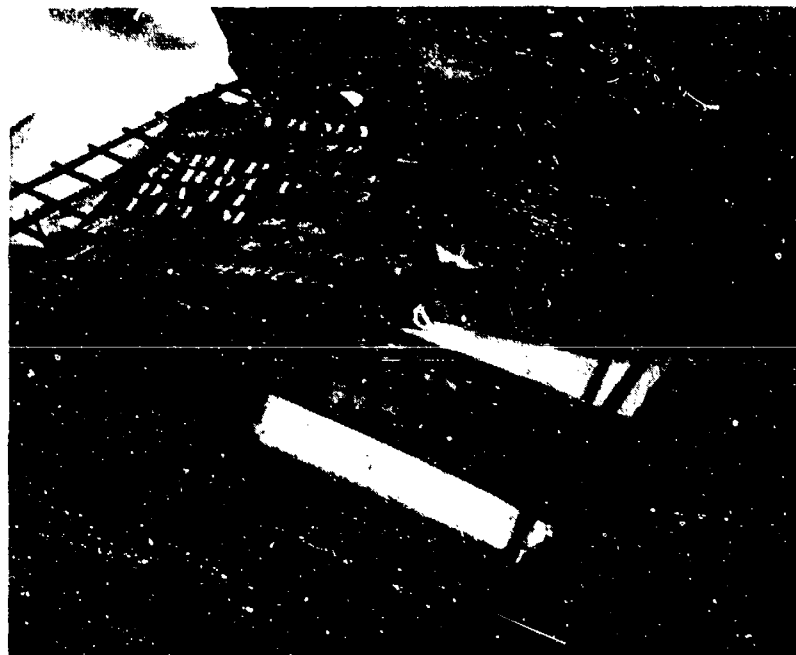


Fig. 246 - LST 52 - Damage to Item 30 after Test Able

230
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see Fig. 238. On the YOG 83, Fig. 247, this item was moved 1/4" to the left at the rear end. Two layers of paper had been scorched and ripped off the top of the container. The tape had been burned through to a depth of one layer on the side facing the blast and no nomenclature was visible. The container was still well sealed, however. On the LST 52, the fiber container was scorched on the blast side, and had been dented by the straps when securing it to the pallet. On the remaining three ships, there was no apparent damage.

h. Shell, HE (1t) M43A1, w/o Fuze, 81mm Mortar (Item #32). Four rounds were displayed in a metal container, see Fig. 248. On the YOG 83, the item was moved away 1/2" by the blast. Apparently it was still vacuum sealed and in good condition. The body of the container was slightly rusted by the rain, but the nomenclature was legible. No effects were evident from the blast. On the remaining ships, no damage was apparent.

i. Shell, HE (hv) M56, w/o Fuze, 81mm Mortar (Item #33). One round was displayed bare, see Fig. 249. On the YOG 83, Fig. 244 and Fig. 250, both before and after Test Able, there was loose TNT in the booster cavity. The propellant increments had broken down before the test and were destroyed by the bombing. The holding clips were in position but rusted. The fins were rusted by the atmosphere. On the LST 52, Fig. 251, the propellant was destroyed and although the primer and ignition cartridge were intact and did not function, their cardboard container was slightly scorched. The propellant clip was rusty. On the LST 661, the increments were burned off by the heat from the bomb blast, but the ignition cartridge was undamaged. On the remaining ships, no damage was apparent.

j. Shell, HE (hv) M56, w/o Fuze, 81mm Mortar (Item #34). One round was displayed in a fiber container see Fig. 249. On the YOG 83, Fig. 238 and Fig. 252, the fiber container was scorched and peeled to a depth of one layer on the top. The paint was also scorched on the metal end. On the LST 52, the fiber container was scorched on the blast side and was also dented by the straps. No damage was apparent on the remaining ships.

k. Shell, HE (hv) M56, w/o Fuze, 81mm Mortar (Item #35). This item was displayed in a metal container, see Fig. 237. On the YOG 83, the cover was slightly rusted around the edges and in spots along the body.

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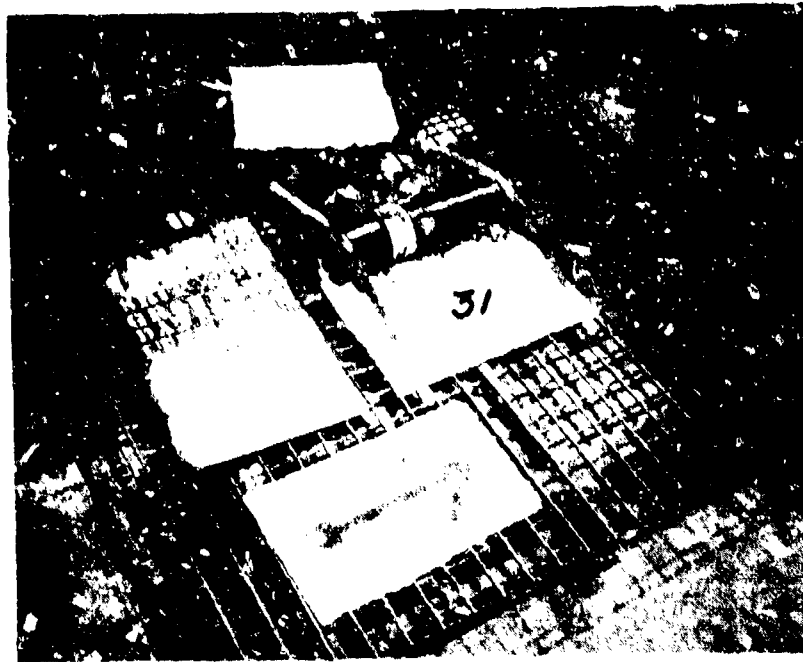


Fig. 247 - YOG 83 - Damage to Item 31 after Test Able.

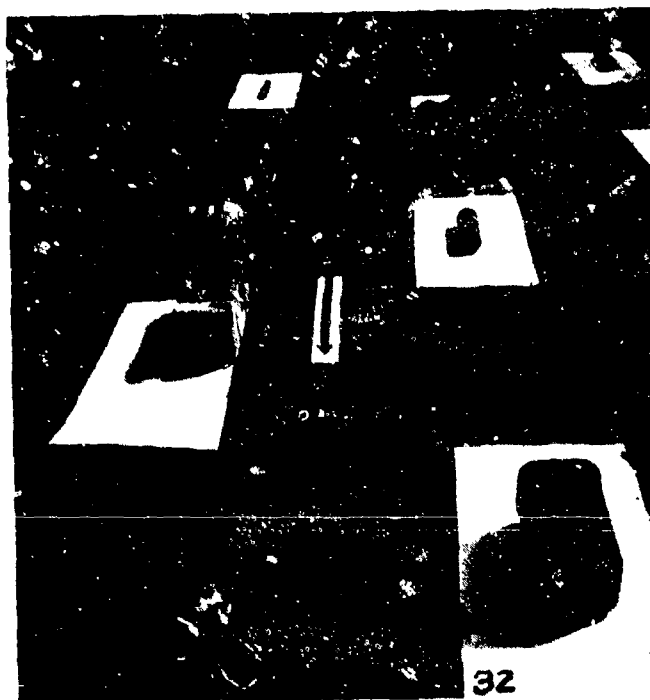


Fig. 248 - LST 52 - Method of displaying Item 32.

232
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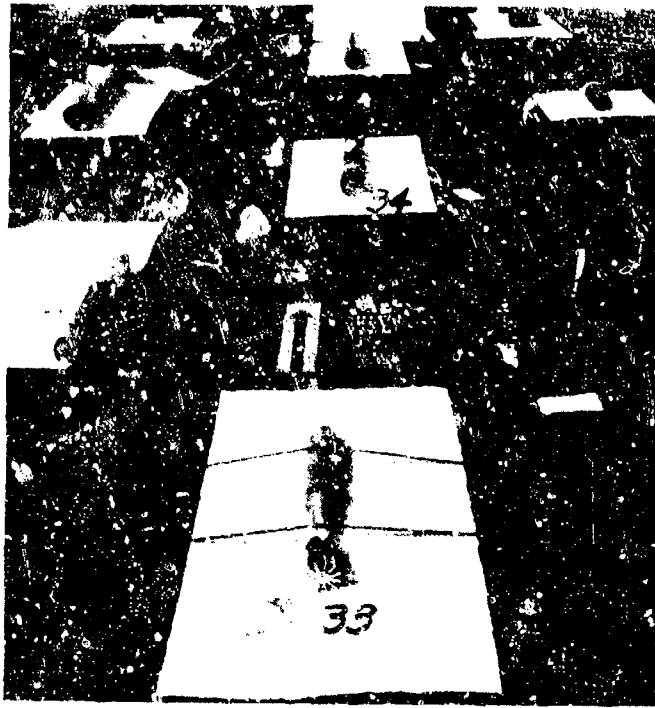


Fig. 249 - LST 661 - Method of displaying
Items 33 and 34.

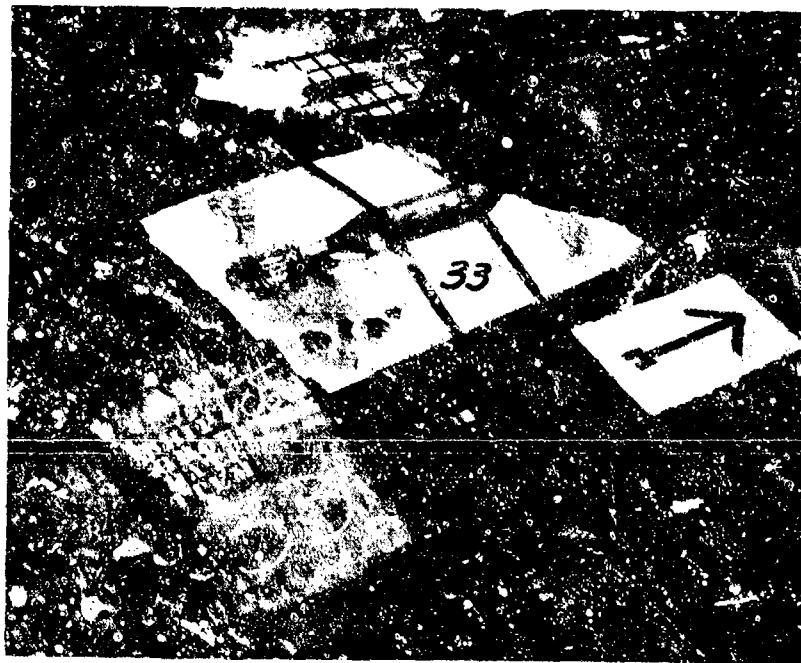


Fig. 250 - YOG 83 - Damage to Item 33 after Test Able.

233
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Fig. 251 - LST 52 - View of Item 33
after Test Able, showing
destruction of propellant.

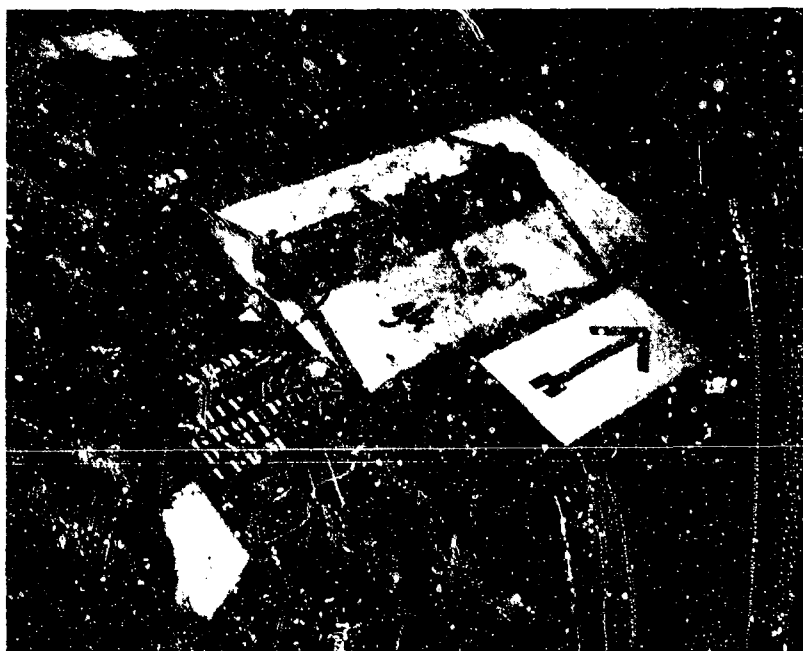


Fig. 252 - YOG 83 - Damage to Item 34 after Test Able.

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An area of about 8 square inches was scorched on the body near the cover. No damage was apparent on the remaining ships.

l. Shell, Smoke, WP, M57, w/o Fuse, 81mm Mortar (Item #36). One shell was displayed bare, see Fig. 253. On the YOG 83, Fig. 254, before Test Able, the powder increments had broken down from sun and rain. On Able day, they were ignited. The holding clips were rusted and distorted and the fins were rusted. The ignition cartridge was serviceable. This item was probably protected by the boat deck. On the LST 52, Fig. 255, the propellant was ignited and the cardboard container slightly scorched. The primer and ignition cartridge had not functioned. The propellant clip was rusty. The round was scorched on the nose and top, apparently from the combustion of a nearby 155 mm propelling charge. On the LST 661, the propellant increments were ignited by the heat from the bomb but the ignition cartridge and percussion primer were not damaged. On the LST's 220 and 545, no damage was apparent.

m. Shell, Smoke, WP, M57, w/o Fuse, 81mm Mortar (Item #37). One shell was displayed in a fiber container, Fig. 256. On the YOG 83, Fig. 257, at least one and possibly two layers of paper from the container were scorched and blown off. The tape was burned and badly consumed, but the round inside was in excellent condition. On the LST 52, Fig. 258, the fiber container was charred, attributed to the burning of the 155 Gun Propelling charges 4 to 6 ft. away. No other damage was visible, except the container had been dented by the securing straps. On the remaining ships, there was no apparent damage.

n. Shell, Smoke, WP, M57, w/o Fuse, 81mm Mortar (Item #38). One shell was displayed in a metal container, Fig. 259 and Fig. 256. On the YOG 83, the after end of the container was moved to the left 1-1/2". The fiber container inside the metal container was undamaged. The metal container was not damaged by the blast, but was rusted on the end and wherever metal strapping crossed it. The container was plentifully spattered by asbestos matting. On the LST 52, there was scorching on the side facing the blast and also on the side facing the nearby 155 mm propelling charges. On the remaining ships there was no damage apparent.

o. Shell, Smoke, FS, M57 w/o Fuse, 81mm Mortar (Item #39). One shell was displayed bare, Fig. 260.

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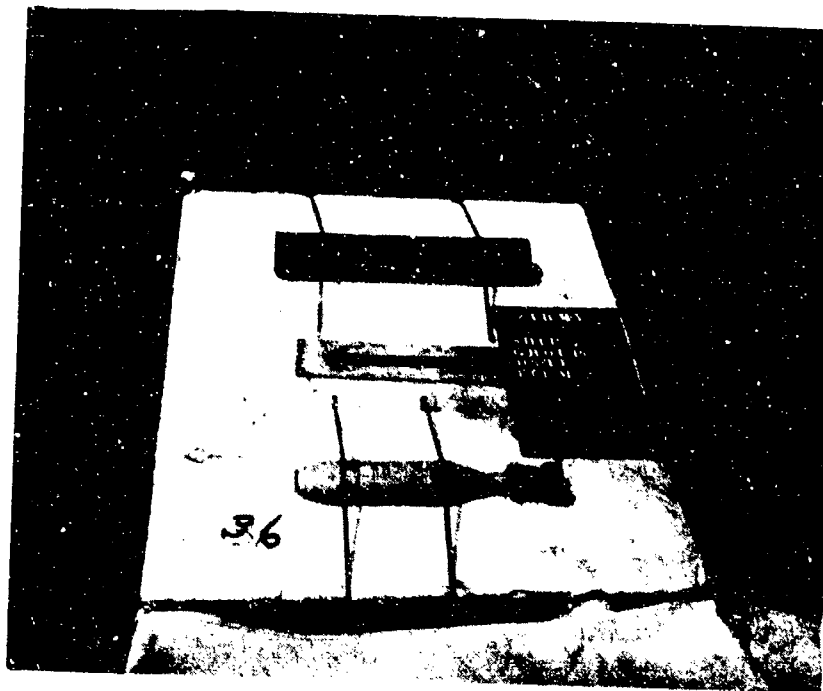


Fig. 253 - LST 52 - Method of displaying Item 36.

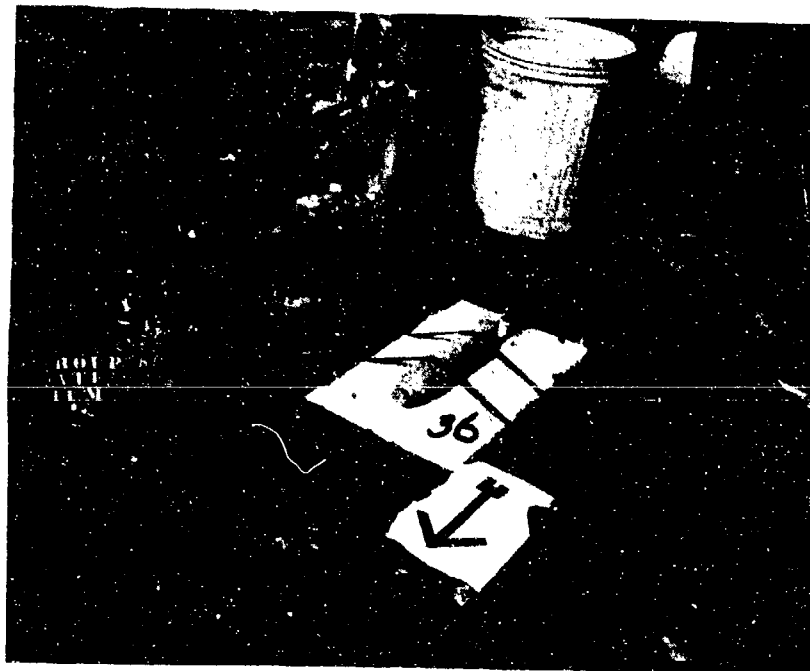


Fig. 254 - YOG 83 - Item 36 after Test Able.

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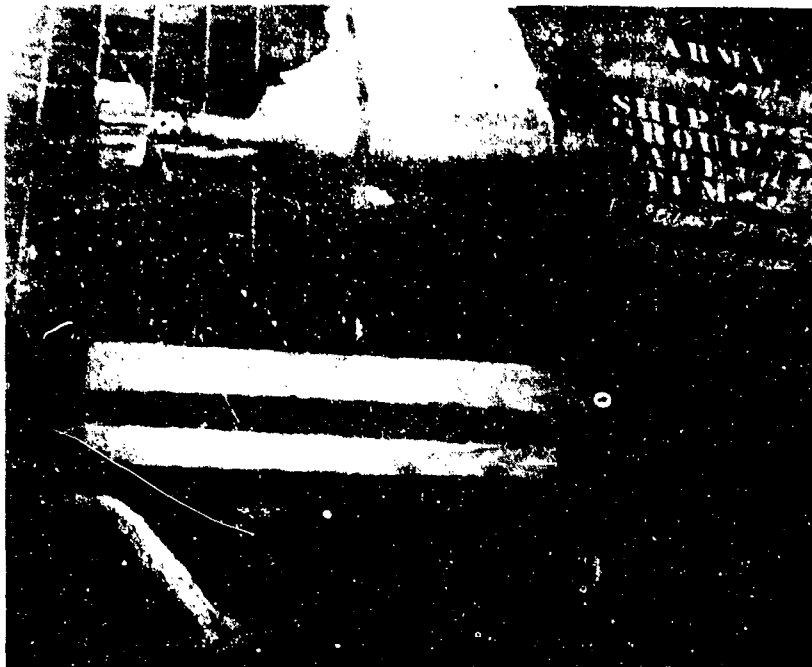


Fig. 255 - LST 52 - Item 36 after Test Able.

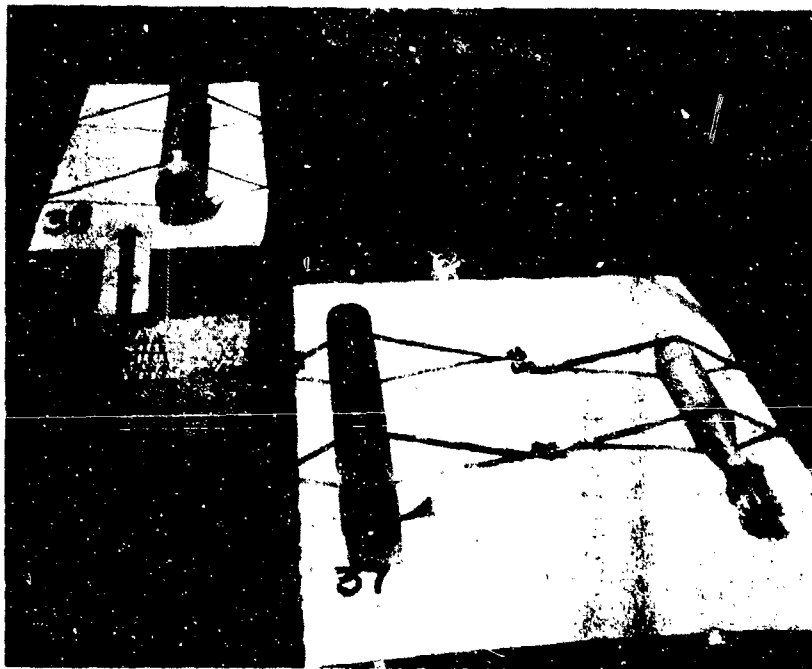


Fig. 256 - LST 661 - Method of displaying
Items 37 and 38.

237
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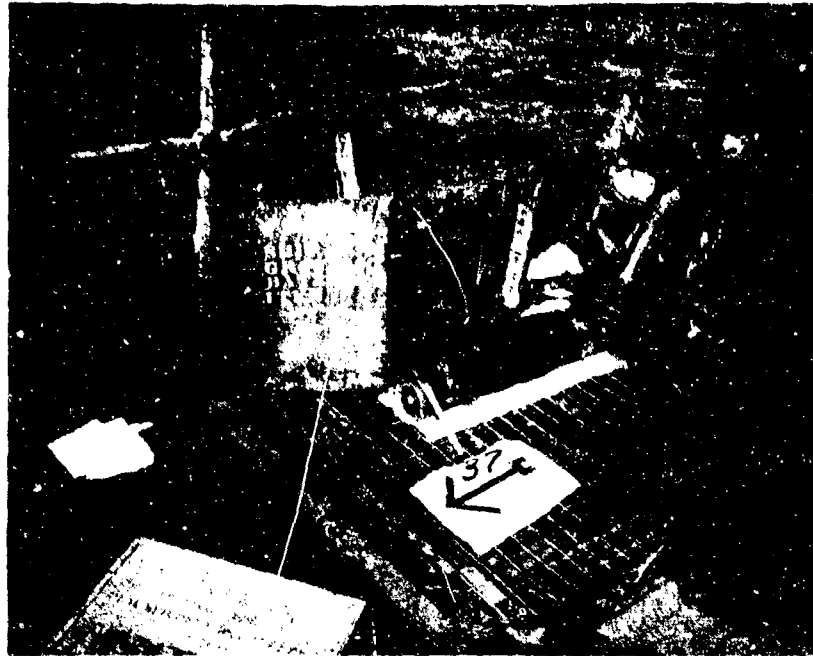


Fig. 257 - YOG 83 - Damage to Item 37 after Test Able.

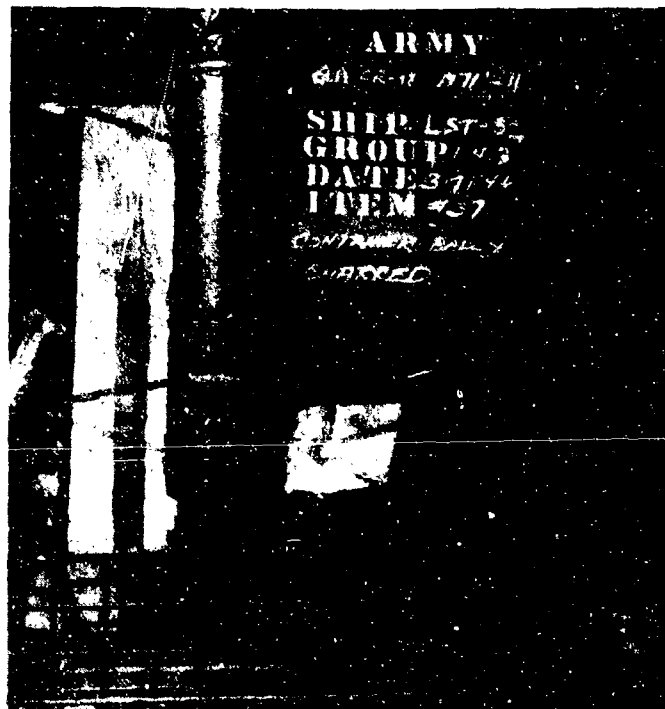


Fig. 258 - LST 52 - View of the charred container of Item 37 after Test Able.

238
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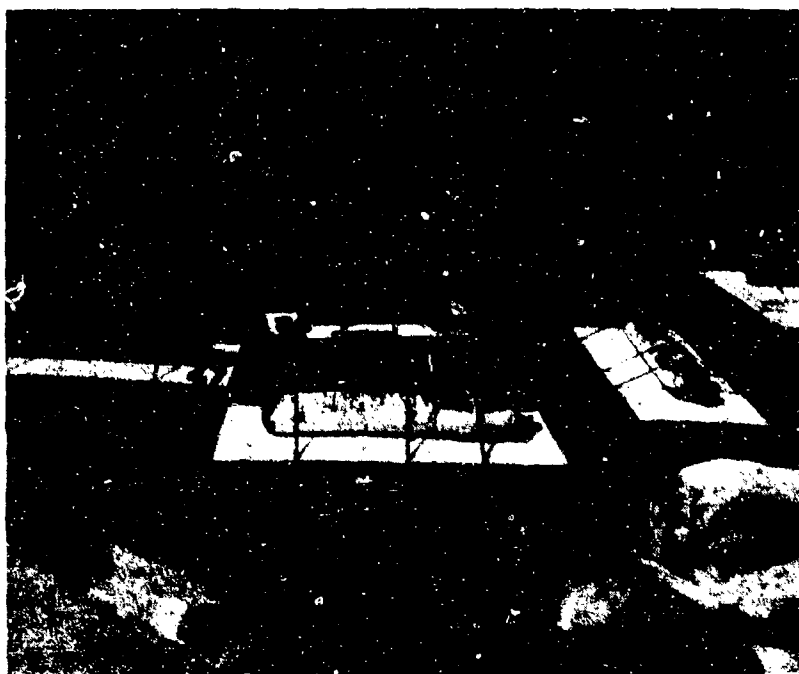


Fig. 259 - LST 52 - Method of displaying Items 38 and 47.



Fig. 260 - LST 661 - Method of securing
Items 39 and 41.

239
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On the YOG 83, Fig. 232 and Fig. 228, the propellant increments had begun to disintegrate and the body and gas rings to rust before Able Day. As a result of the bomb detonation: the shell and gas rings were scorched and the propellant increments ignited. The item was in its original position. On the LST 52, Fig. 261 and Fig. 262, the propellant was destroyed. The primer was intact and the ignition cartridge had not functioned although the cardboard container was slightly scorched. On the LST 661, the propellant increments were destroyed, but the remainder of the round was not damaged. On the remaining LSTs, 545, and 220, no damage was apparent.

p. Shell, Smoke, FS, M57, w/o Fuse, 81mm Mortar (Item #40). One round was displayed in a fiber container, see Fig. 237. On the YOG 83, Fig. 228, the container was heavily scorched, and had peeled. The sealing tape was scorched and torn. No identification was visible except the stencilling on the ends of the container. The container was in its original position. On the LST 52, Fig. 261 and Fig. 262, the container was scorched severely on the side exposed to the blast and was also dented by the straps. On the remaining ships, no damage was apparent.

q. Shell, Smoke, FS, M57, w/o Fuse, 81mm Mortar (Item #41). One shell was displayed in a metal container see Fig. 260. On the YOG 83, Fig. 208 and 229, the container had a slight scorch in an area approximately 1" x 18". This scorch obliterated some of the stencilling on the right side. The container was rusted where the paint had peeled from the left side. The container was in its original position. On the LST 52, Fig. 261, the container was scorched slightly on the side exposed to the blast. There was no damage on the remaining ships.

r. Shell, semi-fixed, HE, M1, w/o Fuse, 105 Howitzer (Item #42). Two rounds were displayed at 90° to each other, see Fig. 263. On the YOG 83, Fig. 238 and Fig. 264, before Test Able, the nose plug had rusted and there was some loose TNT in the booster cavity. After Able Day the round displayed at 0° azimuth was not damaged but the round displayed at 90° to it was smoked a little on the ogive of the projectile. There was a slight corrosion from the atmosphere. No movement of the round was noted. On the other ships, no damage was apparent.

s. Shell, semi-fixed, HE, M1, w/o Fuse, 105 Howitzer (Item #43). One shell was displayed in a metal container,

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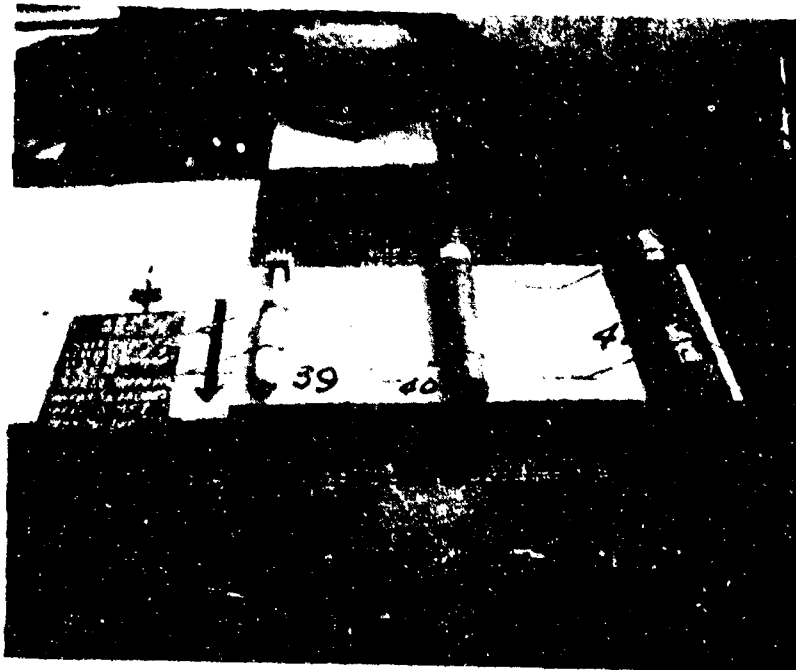


Fig. 261 - LST 52 - Method of displaying Items 39, 40, and 41.



Fig. 262 - LST 52 - Damage to Items 39 and 40 after Test Able.

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Fig. 253 - LCM 220 - Method of display and arrangement of Item 42.

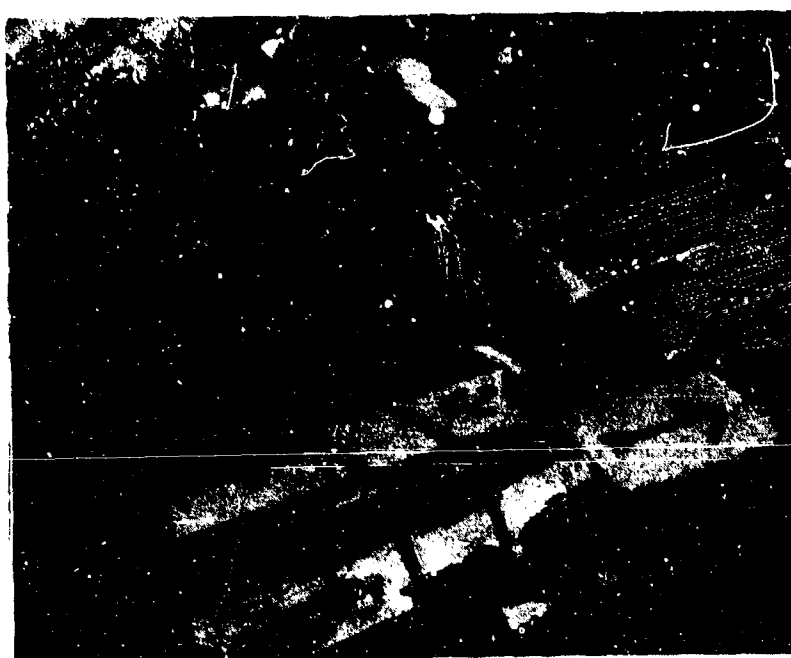


Fig. 264 - YOG 83 - Damage to Item 43 after Test Able.

242
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see Fig. 265. On the YOG 83, the metal container was moved 1/4" forward. There was a scorched area 2-1/2" x 14" where the container was rustencilled and the new paint had burned. No other effects on the metal container were noted. Inside the container, the two rubber discs melted on the surfaces touching the metal. When pulled out, the discs had a sticky surface. The projectile and cartridge case were in excellent condition. The round was unfused but was assembled with an M2A1 booster. On the LST 52, there was evidence of scorching and the markings on the container were illegible. On the remaining ships, there was no damage visible.

i. Shell, semi-fixed, WP, M60, w/o Fuse, 105mm Howitzer (Item #44). Two shells were displayed bare, at 90° to each other, see Fig. 266. On the YOG 83, Fig. 267 and Fig. 268, the propelling charge of the shell at 90° azimuth was destroyed, but the primer was intact. The case was badly corroded and discolored inside and out on the side nearest the burned 155mm propelling charges. The opposite side was only dulled by smoke. The case was moved 2-1/2" to its rear apparently by the pressure generated when its propelling charge burned. The base of the case was badly corroded and pitted. Some of the grains of the 105mm propelling charges were found on the deck within a 12 foot radius. The projectile was badly scorched and all the markings burned off. The yellow band was visible only as a raised strip on the surface. The nose plug was badly rusted. The nose plug gasket was burned through. The shell at 0° azimuth was scorched on the left side by the combustion of the propelling charge of the other shell. The markings and paint were in poor condition but the markings were legible. The nose plug was badly rusted. On the LST 52, the item was masked by the bow coaming. No damage was apparent on this or any of the remaining ships.

ii. Shell, semi-fixed, WP, M60, w/o Fuse, 105mm Howitzer (Item #45). This shell was displayed in a metal container, see Fig. 269. On the YOG 83, the metal container showed no effects from the blast. The fiber container inside was also undamaged. On the LST 52 the container was scorched on the end exposed to the blast. On the remaining ships there was no damage apparent.

iii. Charge, Propelling, 155mm Guns, M1, M1A1 (Item #46). Two charges were displayed at 90° to each other, see Fig. 270. On the YOG 83, Fig. 271 and Fig. 272, both

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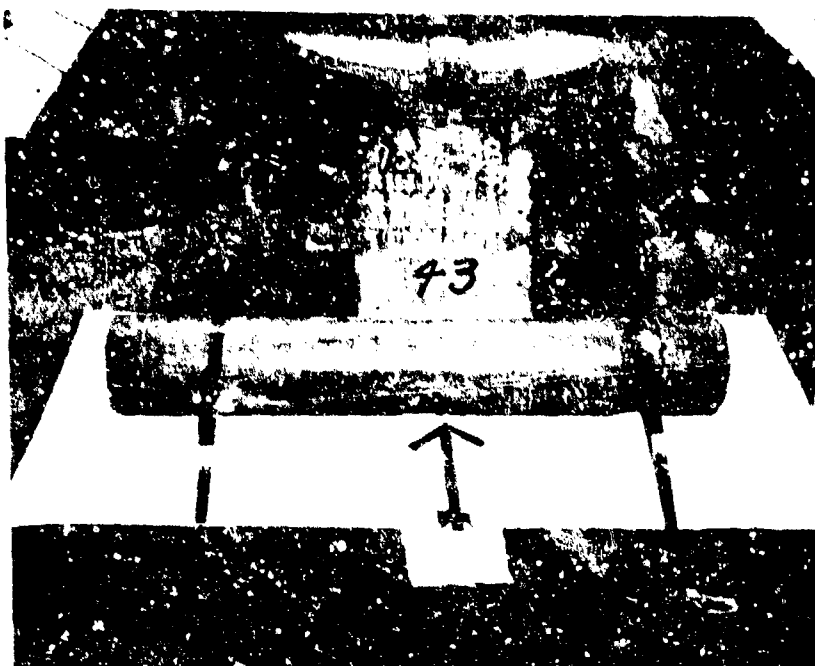


Fig. 265 - YOG 83 - Method of displaying Item 43.

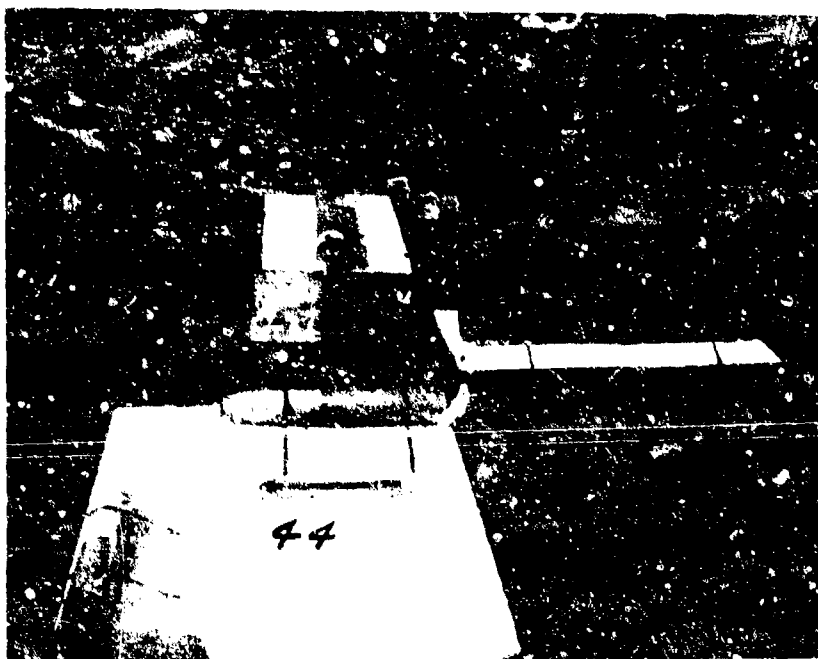


Fig. 266 - LST 52 - Method of securing Item 44.

244
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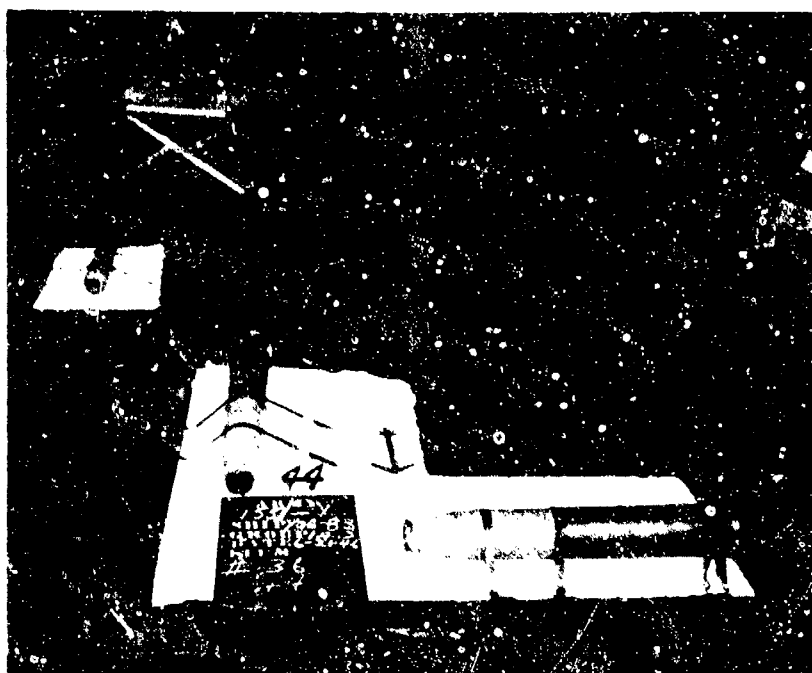


Fig. 267 - YOG 83 - Method of displaying Item 44.

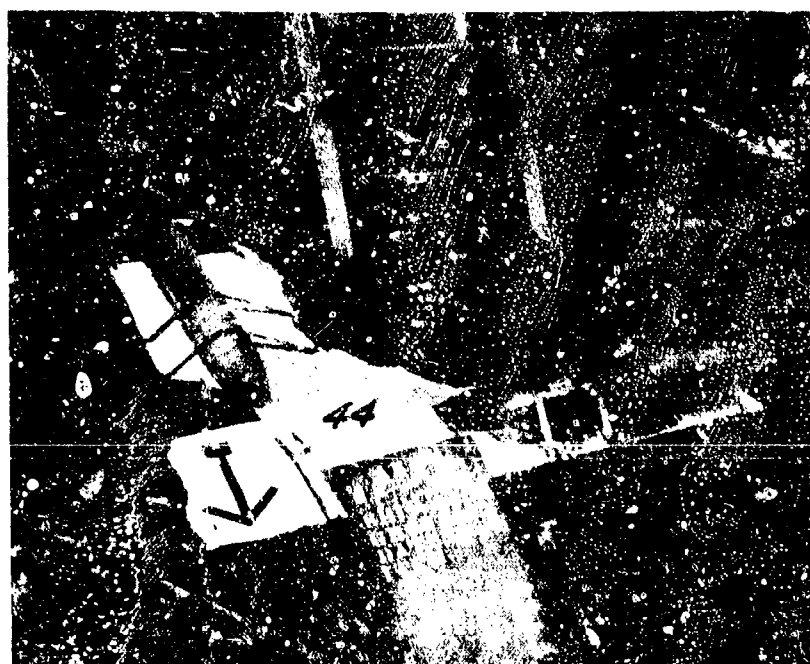


Fig. 268 - YOG 83 - Damage to Item 44 after Test Able.

245
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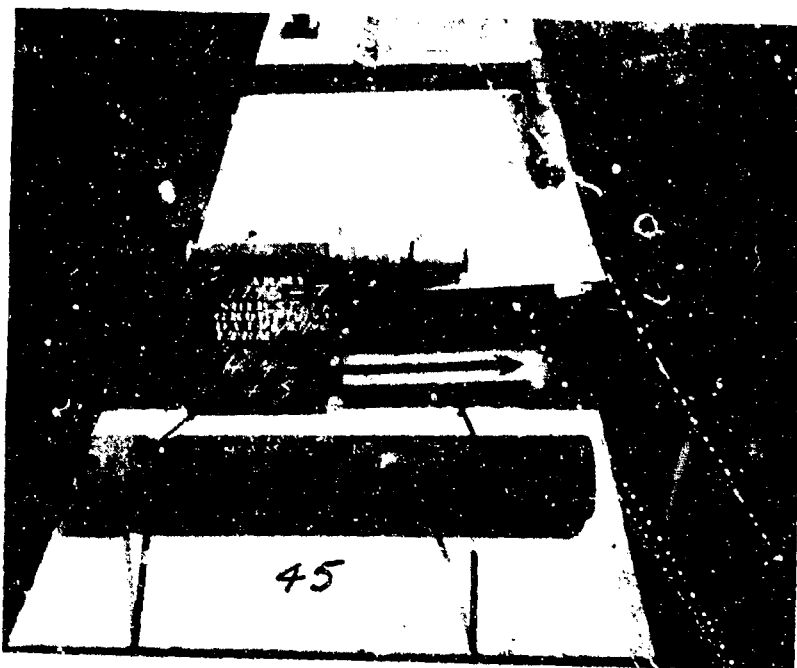


Fig. 269 - LST 661 - Method of displaying Item 45.

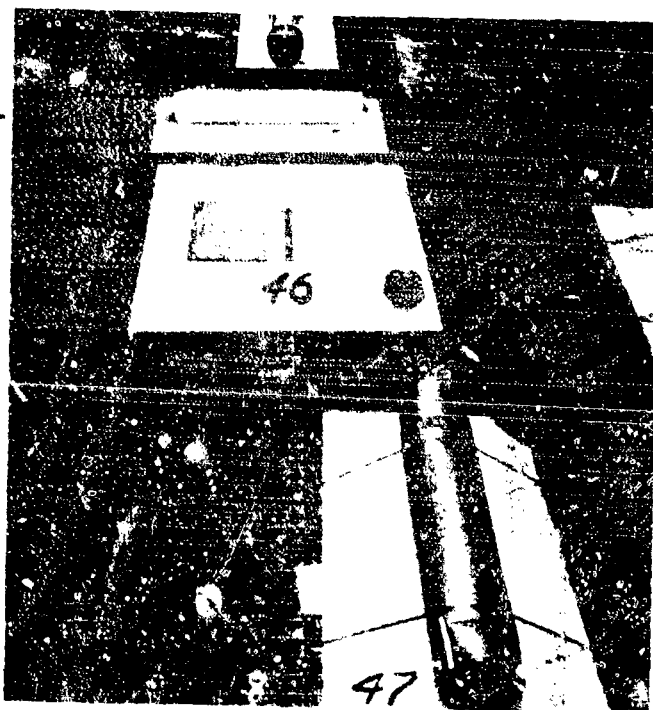


Fig. 270 - Lst 661 - Method of display and arrangement of Items 46 and 47.

246
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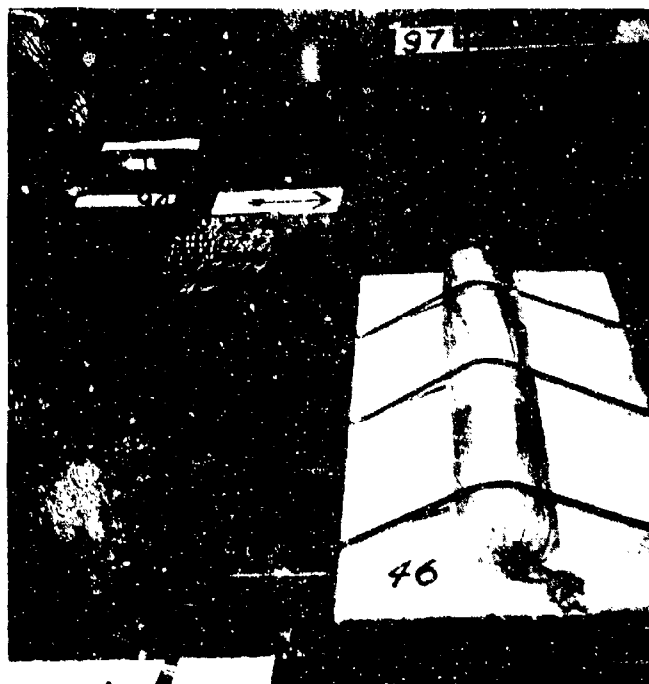


Fig. 271 - YOG 83 - Method of displaying
Items 46, 94, and 97.

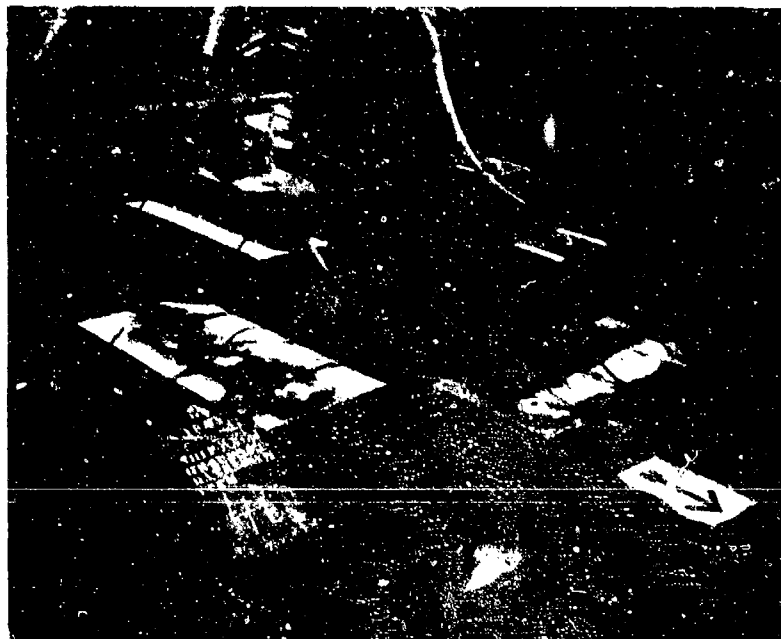


Fig. 272 - YOG 83 - View after Test Able showing
destruction of Item 46.

247
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propelling charges were destroyed by heat from the bomb. Parts of the igniter bag as well as part of the plio-film waterproof bag were found on the deck. Grains of powder burned in varying amounts were found within a 15 foot radius on the deck. The rear of the charge at 0° azimuth moved from 4" to 6" to the right during combustion. The 90° azimuth charge did not move its position during the burning. The asbestos matting was badly charred under both charges. On the LST 52, Fig. 273, Fig. 274, and Fig. 275, the charges were destroyed. Grains of partially burned powder were scattered over a radius of 20 feet. No damage was apparent on the remaining ships.

W. Charge, Propelling, 155mm Guns, M1, M1A1 (Item #47). One charge was displayed in a fiber container, see Fig. 270. On the YOG 83, Fig. 276, and Fig. 277, the paper was scorched and tattered through the first layer. No nomenclature was visible. The end of the container was badly scorched and the paint burned off. It is believed that the damage was caused by the combustion of the two bare propelling charges nearby. When the lid was removed to inspect the charge inside, it was found that the wooden spacer was slightly scorched but the charge was not harmed. On the LST 52, Fig. 259 and Fig. 278, the container was charred by the burning of the 155mm propelling charges 4 ft. away. No other damage occurred except that the container was dented by the securing straps. The item was partially masked by a vent 18" in diameter by 3-1/2' high, approximately 1' distant. On the LST 661, the item was partially masked by a winch. There was no apparent damage on the remaining ships.

X. Charge, Propelling, 155mm Guns, M1, M1A1 (Item #48). This item was displayed in a metal container, see Fig. 279. On the YOG 83, the container was scorched slightly by the heat of the blast. The CROSSROADS marking was scorched but was legible because it appeared scorched into the metal. The nomenclature was not harmed. The container was rusted around the base and mouth. On the LST 52, the container was dented by handling and shipping. On the LST 661, the item was masked by the bow rail. No damage was evident on the remaining ships.

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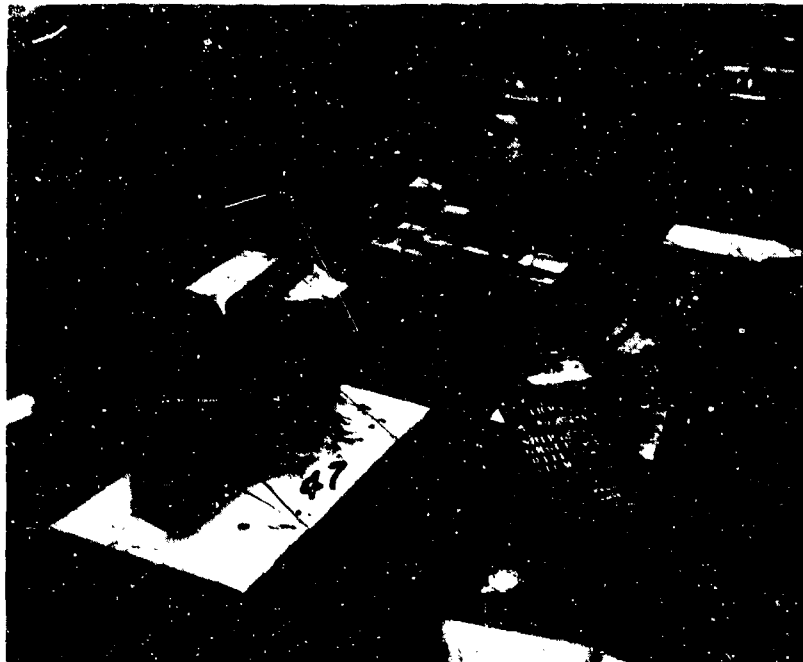


Fig. 273 - LST 52 - View after Test Able showing the destruction of Item 46 and the charring of Item 47.

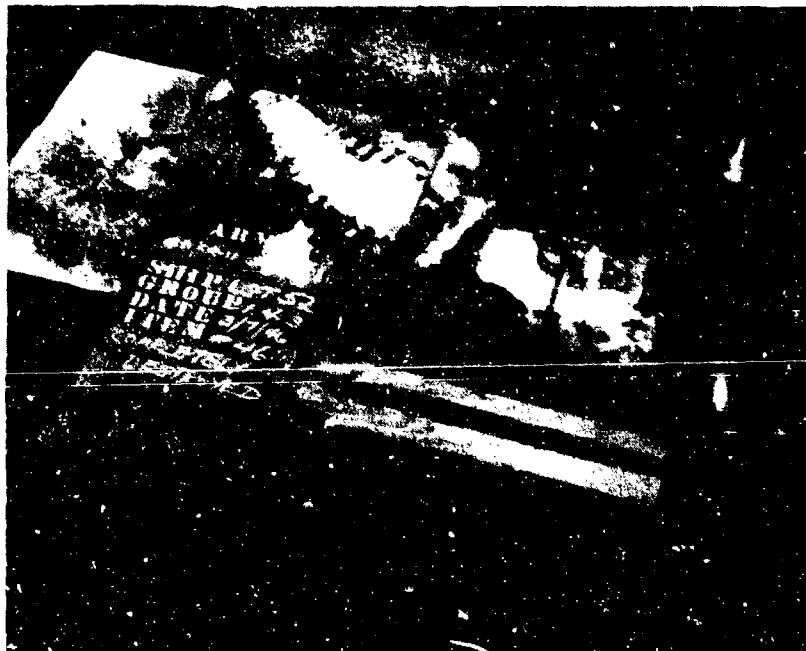


Fig. 274 - LST 52 - View after Test Able showing the destruction of Item 46.

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Fig. 275 - LST 52 - View after Test Able
showing the destruction of Item 46.

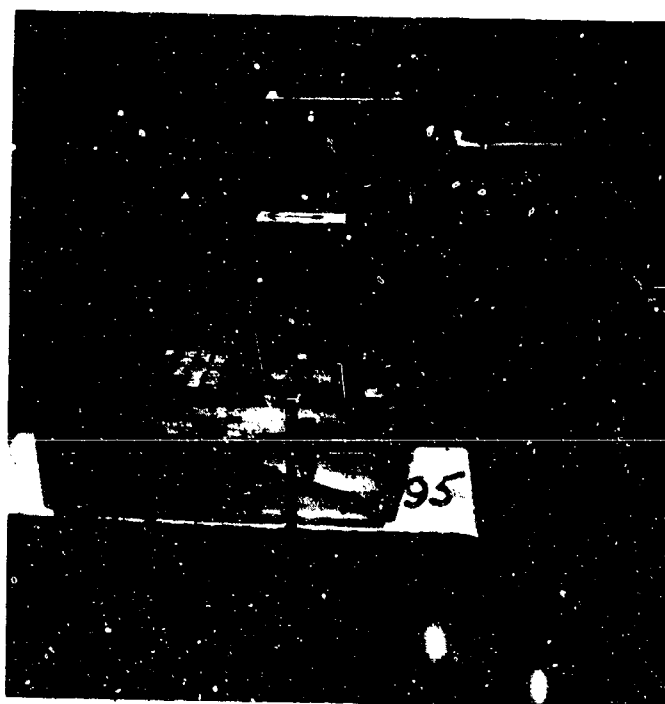


Fig. 276 - YOG 83 - Method of securing
Item 47.

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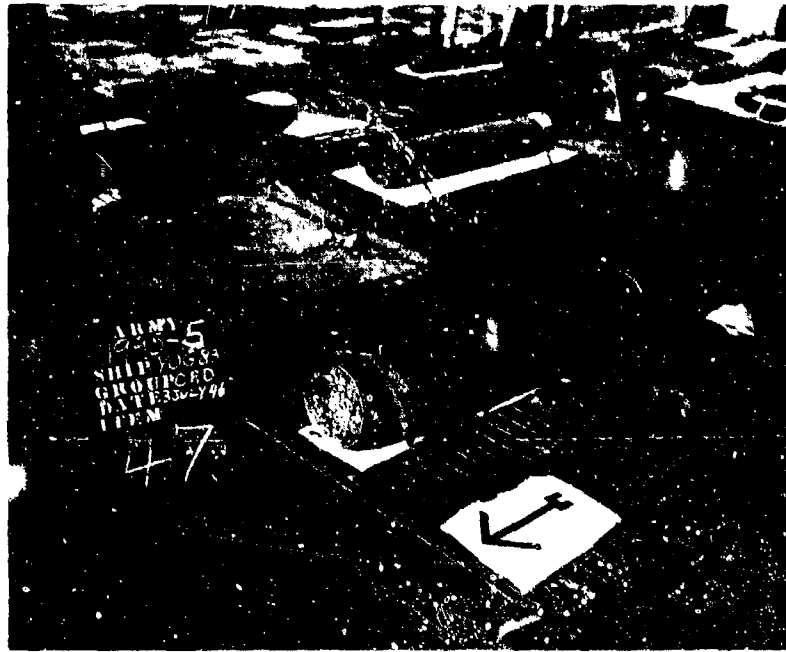


Fig. 277 - YOG 93 - View of the charred fiber container of Item 47 after Test Able.

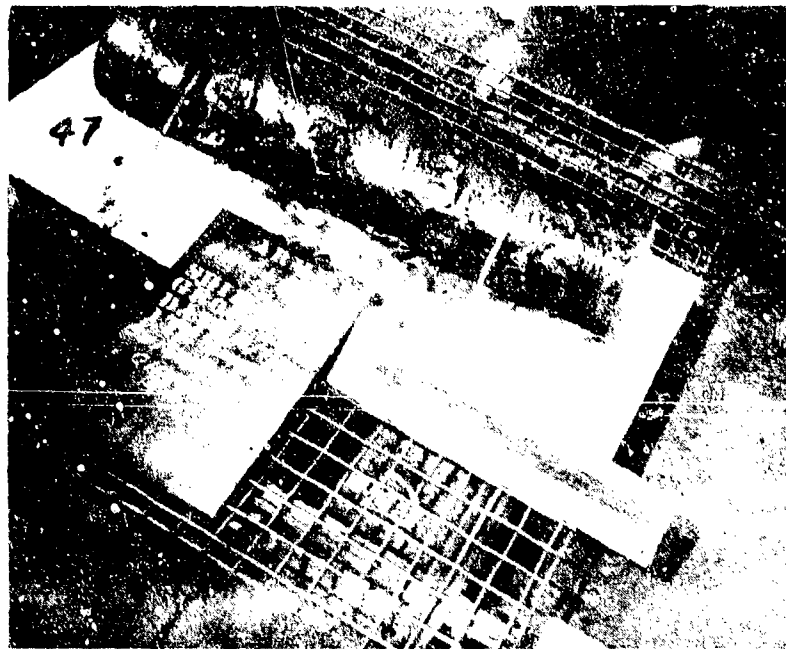


Fig. 278 - LST 52 - Damage to Item 47 after Test Able.

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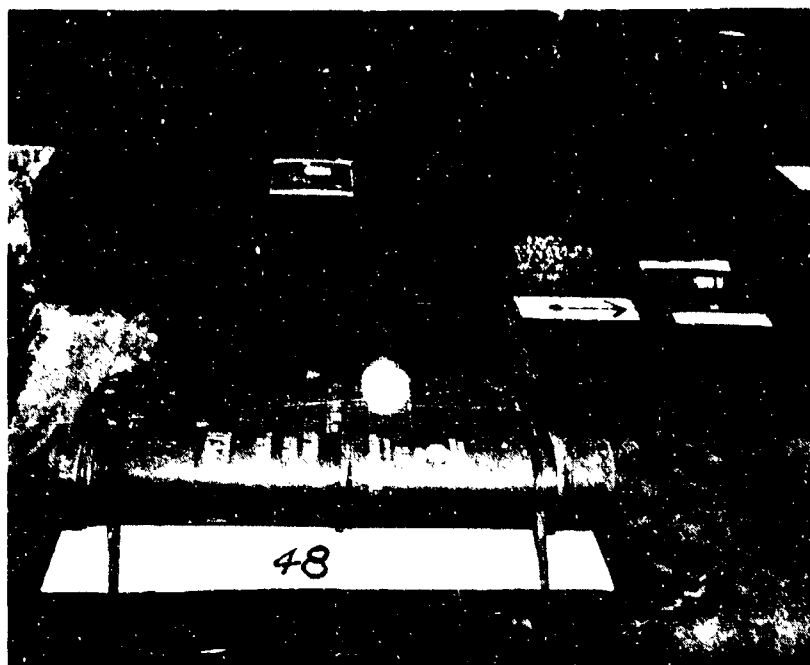


Fig. 279 - YOG 83 - Method of displaying Item 48.

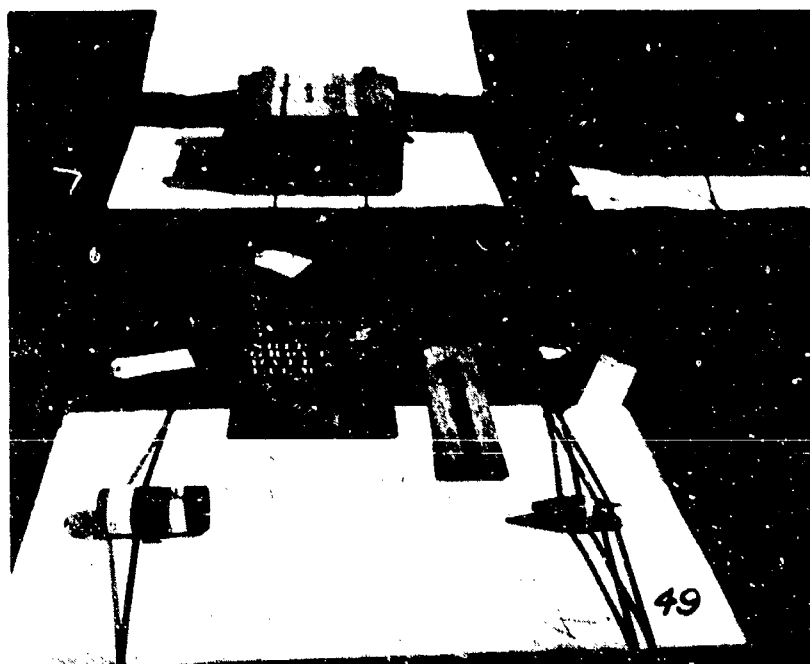


Fig. 280 - LST 661 - Method of securing Item 49.

252
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3. FUZES FOR ARTILLERY AMMUNITION

a. Fuse, T.M., M43A3, w/Booster, M20A1 (Item #49). One fuze was displayed bare on a sheet metal plate. Fig. 280. On the YOG 83, the fuze was slightly corroded. No visible damage was done by the bomb. On the LST 52, the item was displaced 29" forward but suffered no damage, Fig. 281 and 282. No damage was apparent on any other target ship.

b. Fuse, T.M., M43A3, w/Booster, M20A1 (Item #50). One fuze was displayed in a fiber container, Fig. 283. On the YOG 83, Fig. 284, the heat scorched through one layer of paper and left it tattered. The markings on the tape could not be read since it was partially torn off. On the LST 52, Fig. 282, the fiber container was scorched on the blast side. It was also dented by the straps. No damage was apparent on the remaining target ships.

c. Fuse, T.M., M43A3, w/Booster, M20A1 (Item #51). Twenty-three fuzes were displayed in a wooden box, Fig. 285. On the YOG 83, Fig. 286 and Fig. 287, the side and end toward the blast were scorched and charred about equally. The nomenclature facing the bomb was obliterated by scorching. The box was scorched on the blast side, on the LST 52, but was serviceable. On the LST 661, the box was slightly scorched on the side directly exposed to the blast but the markings were still legible. On the LST's 220 and 545, there was no apparent damage.

d. Fuse, T.M., M43A1, w/o Booster (Item #52). One fuze was displayed bare on a sheet metal plate, Fig. 288. On the YOG 83, Fig. 289, the fuze was partially masked by a hatch. The fuze was still in position but the parchment paper disk covering the flash hole was blown away. The fuze was slightly corroded by the rain. On the LST 52, Fig. 290 and Fig. 291, the item was displaced 14-1/2" toward the blast. The metal holding strap was broken, but the item was still serviceable. No damage was apparent on the remaining target ships.

e. Fuse, T.M., M43A1, w/o Booster (Item #53). One fuze was displayed in a fiber container, Fig. 288. On the YOG 83, Fig. 289 and Fig. 292, the container was slightly scorched on the blast side and end. The paper was peeled and tattered. The markings protected by the steel strappings were legible, but all other markings were obliterated. On the LST 52, the fiber container was slightly scorched on the blast side and was dented by the straps. No damage was apparent on the remaining

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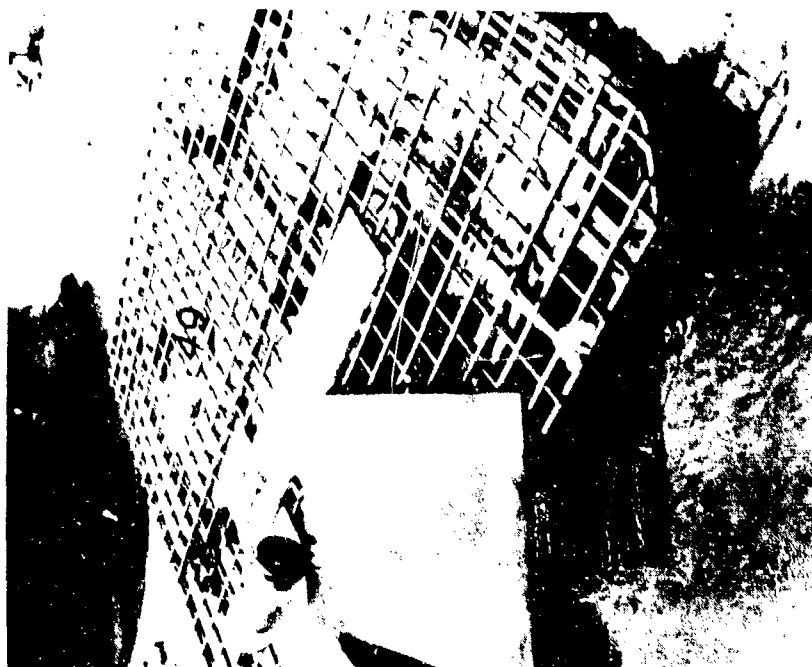


Fig. 282 - LST 52 - Items 49 and 50
after Test Able.



Fig. 283 - LST 52 - Method of displaying
Item 49.

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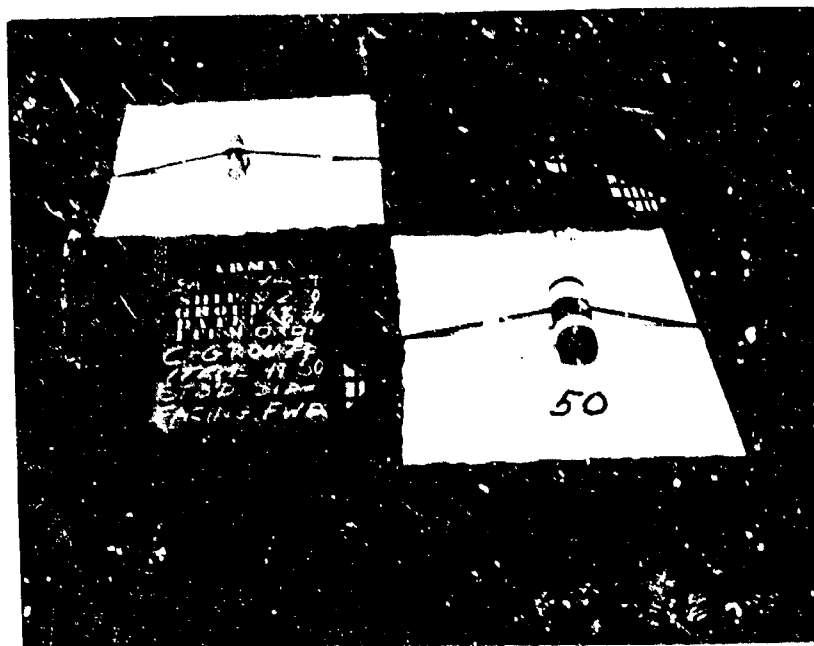


Fig. 283 - LST 220 - Method of securing Item 50.

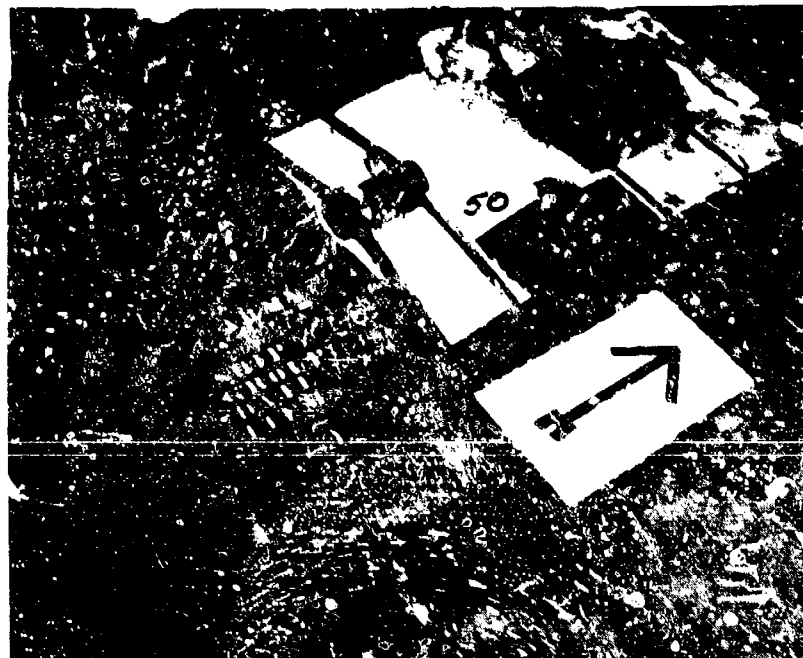


Fig. 284 - YOG 83 - View of charred fiber container of Item 50 after Test Able.

255
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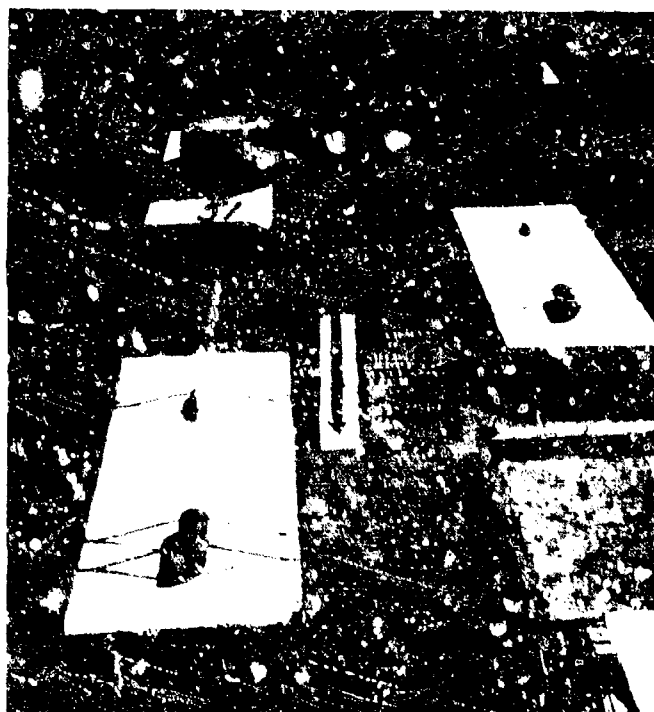


Fig. 285 - LST 52 - Method of securing Item 51.



Fig. 286 - YOG 83 - Method of displaying Items 51 and 86.

256

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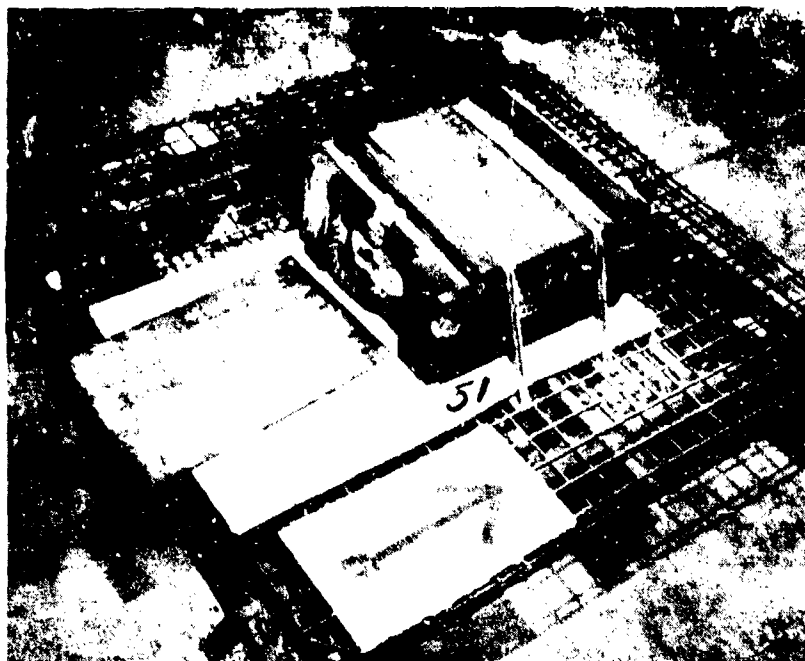


Fig. 287 - YOG 83 - Damage to Item 51 after Test Able.

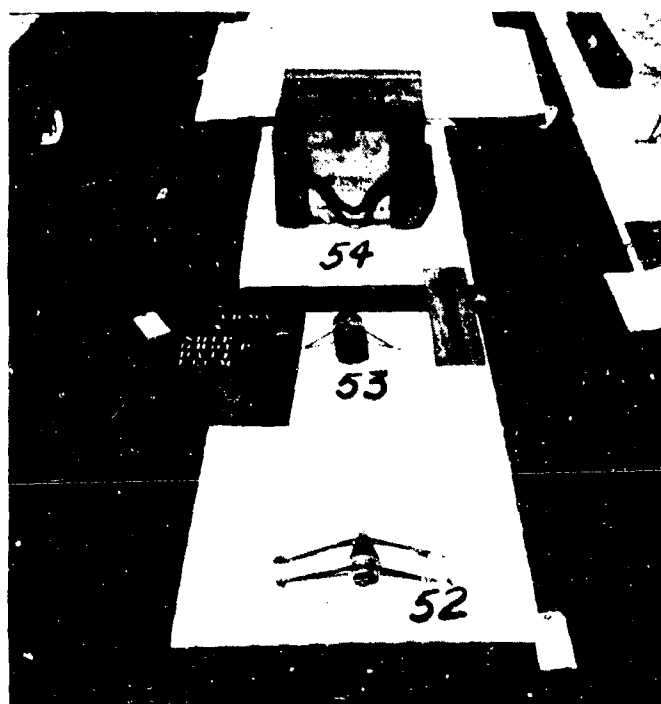


Fig. 288 - LST 661 - Method of securing
Items 52, 53, and 54.

257
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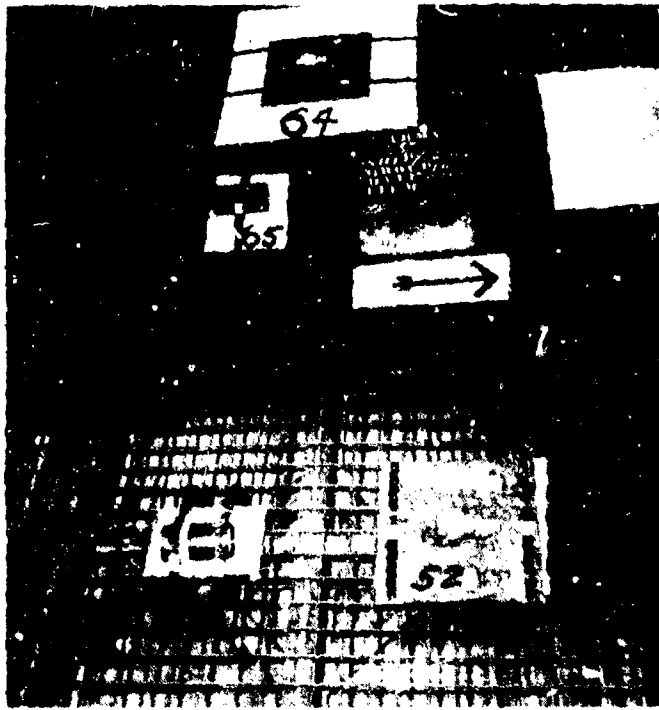


Fig. 289 - YOG 83 - Method of displaying
Items 52, 53, 64, and 65.

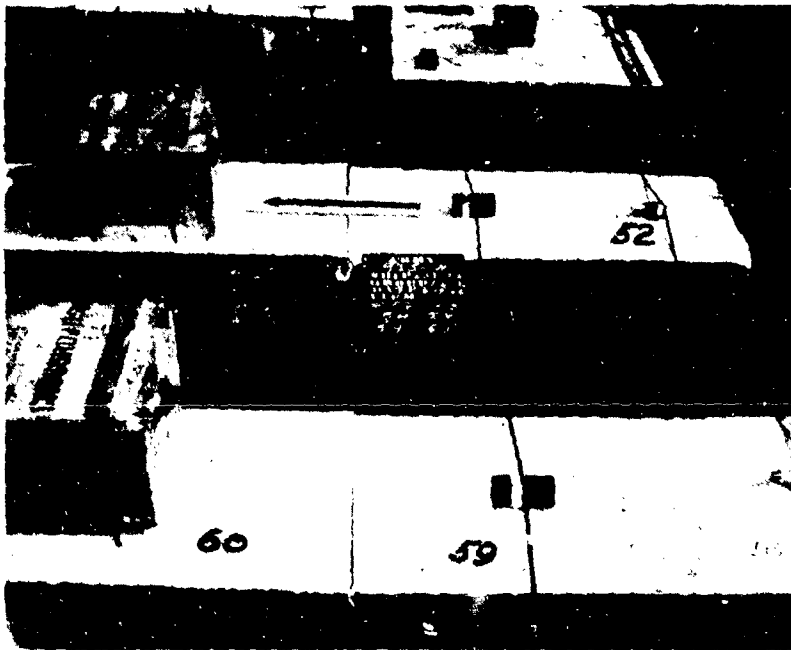


Fig. 290 - LST 52 - Method of securing Items
52, 59, and 60.

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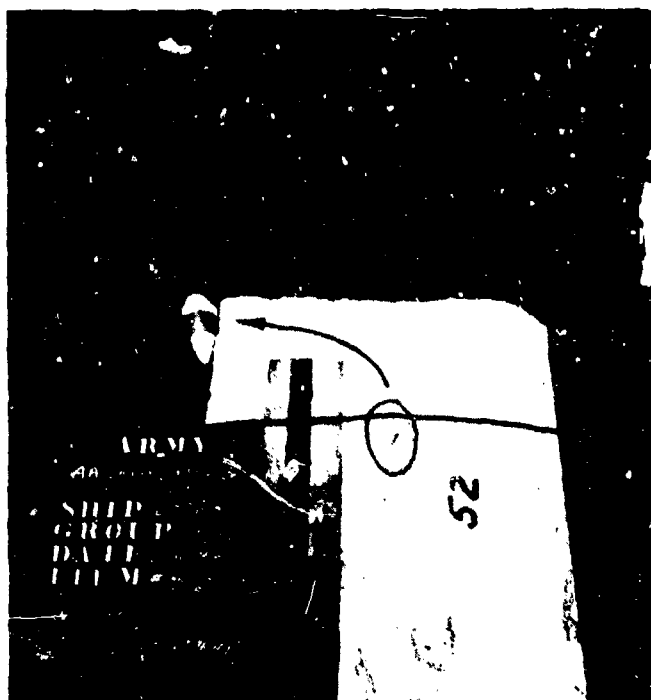


Fig. 291 - LST 52 - View after Test Able
showing the displacement of Item 52.

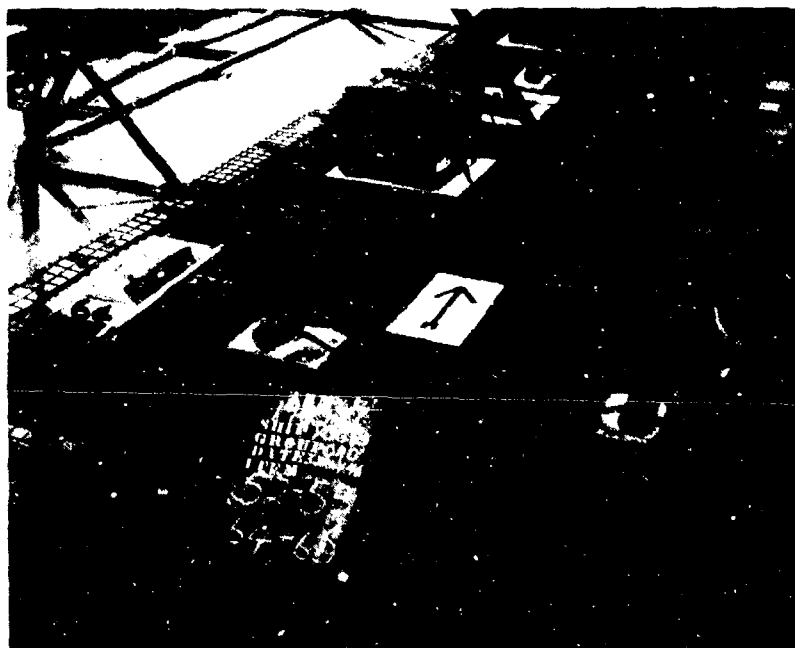


Fig. 292 - YOG 83 - Damage to Items 52, 53, 64, and 65
after Test Able.

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ships.

f. Fuse, T.M., M43A1, w/o Booster (Item #54). Forty-eight of these fuzes were displayed in a wooden box, Fig. 288. On the YOG 83, Fig. 293, the lower part of the box was masked by a hatch. The upper third of the end and sides and all of the top was scorched. The exposed rope handle was also scorched. The markings were still legible except those on the lid most of which were scorched to illegibility. On the LST 52 and 661, the box was slightly scorched on the blast side. The markings remained legible. No damage was apparent on the remaining two LST's.

g. Fuse, P.D., M48A2, w/Booster, M21A1 (Item #55). One fuze was displayed bare on a metal plate, Fig. 294. On the YOG 83, Fig. 295, there was no visible damage except corrosion of the fuze because of rain. No damage was visible on the other ships.

h. Fuse, P.D., M48A2, w/Booster, M21A1 (Item #56). One fuze was displayed in a fiber container, Fig. 294. On the YOG 83, Fig. 295, there were no effects from the atomic bomb. The fiber container was scorched on the blast side and dented by the straps on the LST 52. No damage was apparent on the remaining LST's.

i. Fuse, P.D., M48A2, w/Booster, M21A1 (Item #57). Twenty-three fuzes were displayed in a wooden box. On the YOG 83, Fig. 296 and Fig. 297, the box was slightly scorched on the blast side and end. The nomenclature was obliterated on these two sides but legible on the others. The rope handle was also scorched. Mask marks made by the strapping were clearly visible on the blast side. On the LST 52, the box was scorched on the blast side, but was still serviceable. On the LST 661, all markings were obliterated from the box on the side directly exposed to the blast. No damage was apparent on the remaining LST's.

j. Fuse, P.D., M48A2, w/o Booster (Item #58). One fuze was displayed bare on a sheet metal plate, Fig. 298. On the YOG 83, Fig. 299, there were no visible effects from the bomb, but there was a slight corrosion because of rain. Rust on the nose was from the wire strapping. No damage was apparent on the four remaining LST's.

k. Fuse, P.D., M48A2, w/o Booster (Item #59). One fuze was displayed in a fiber container, Fig. 290. On the YOG 83, Fig. 299 and Fig. 300, two layers of paper

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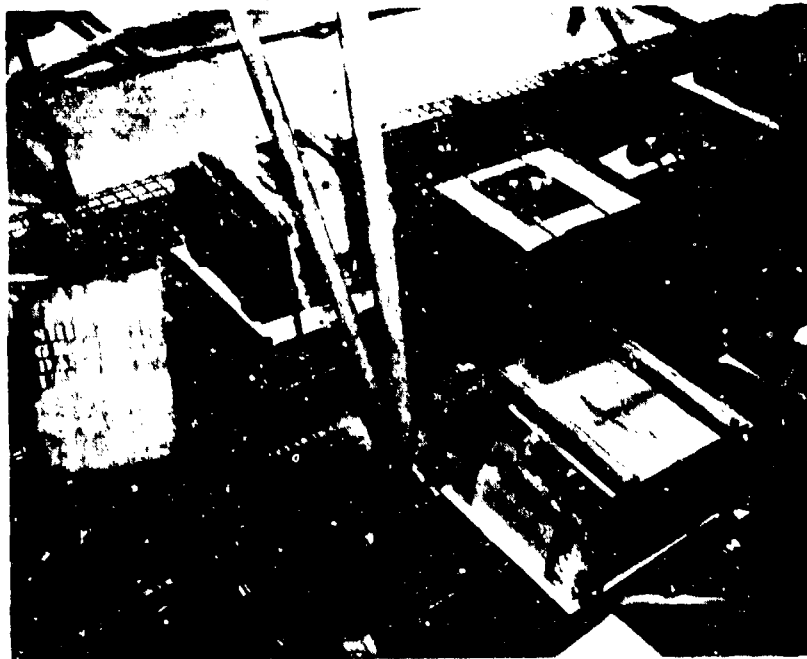


Fig. 293 - YOG 83 - Able Test damage to Items 54 and 66.

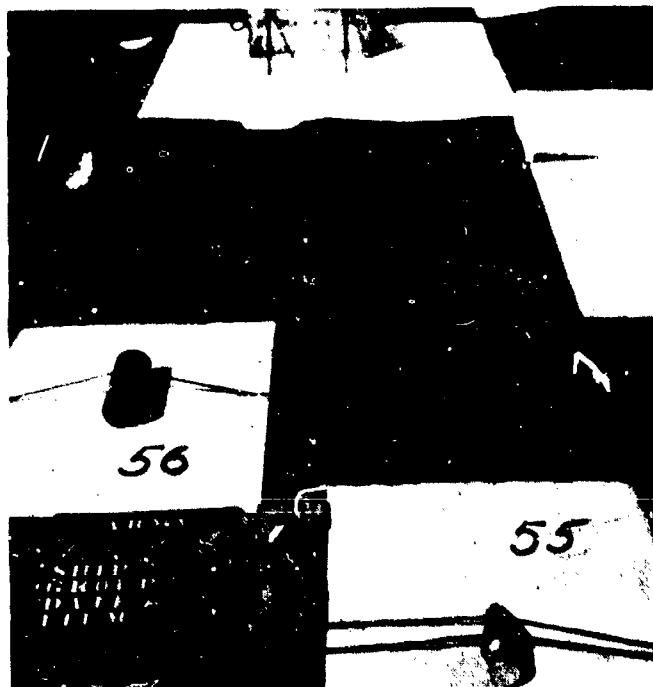


Fig. 294 - LST 661 - Method of displaying Items 55 and 56.

261
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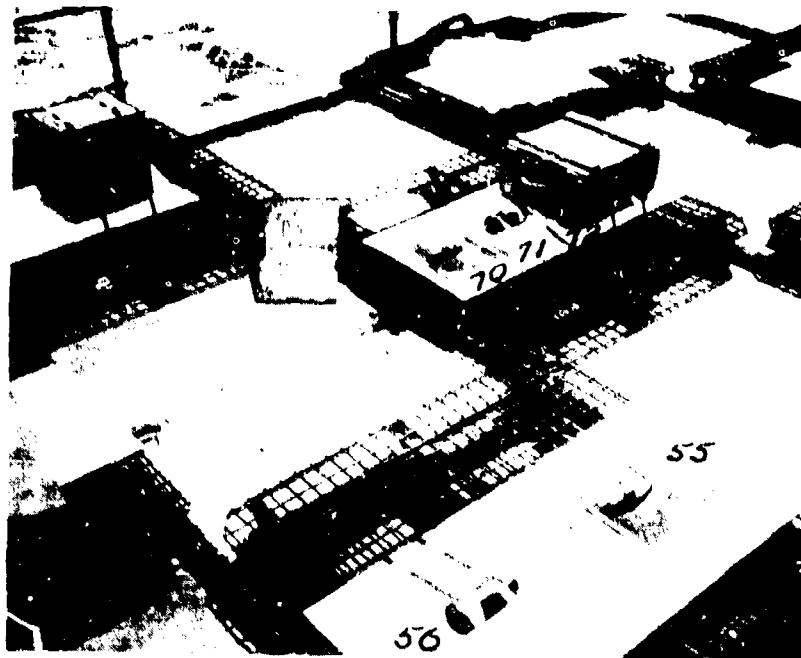


Fig. 295 - YOG 83 - Method of displaying Items 55, 56, 70, 71, and 72.



Fig. 296 - YOG 83 - Method of securing Item 57.

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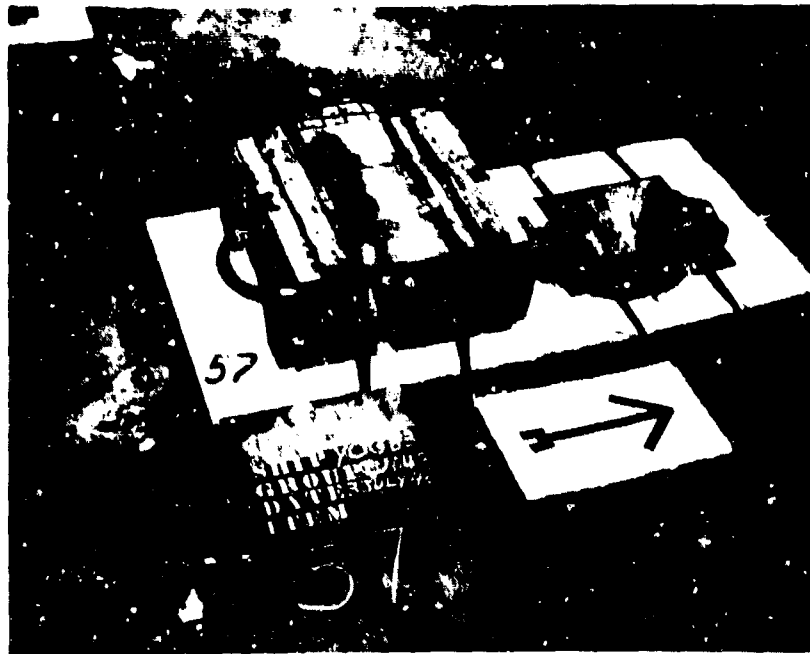


Fig. 297 - YOG 83 - View after Test Able of the scorched box of Item 57.

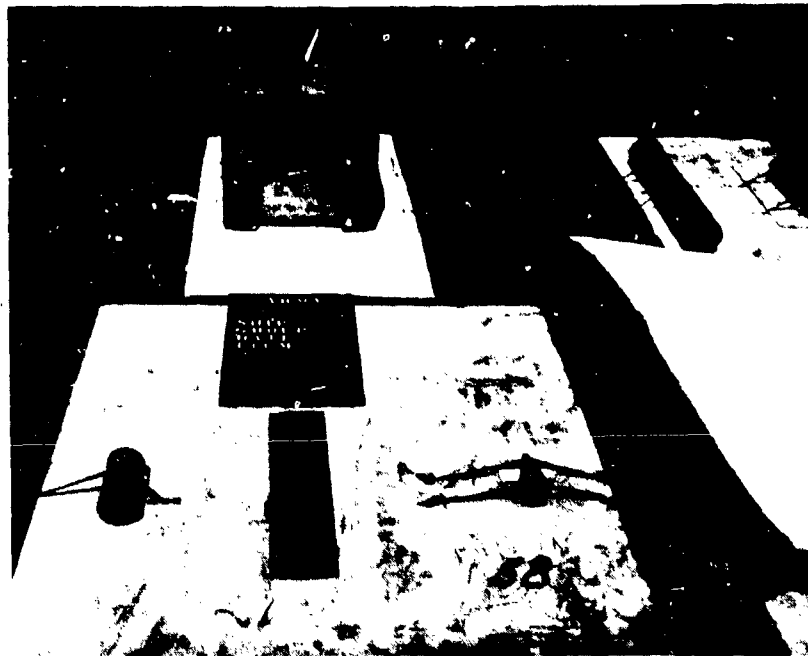


Fig. 298 - LST 661 - Method of securing Item 58.

263
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Fig. 300 - YOG 83 - Damage to Items
59, 67, and 68 after Test Able.

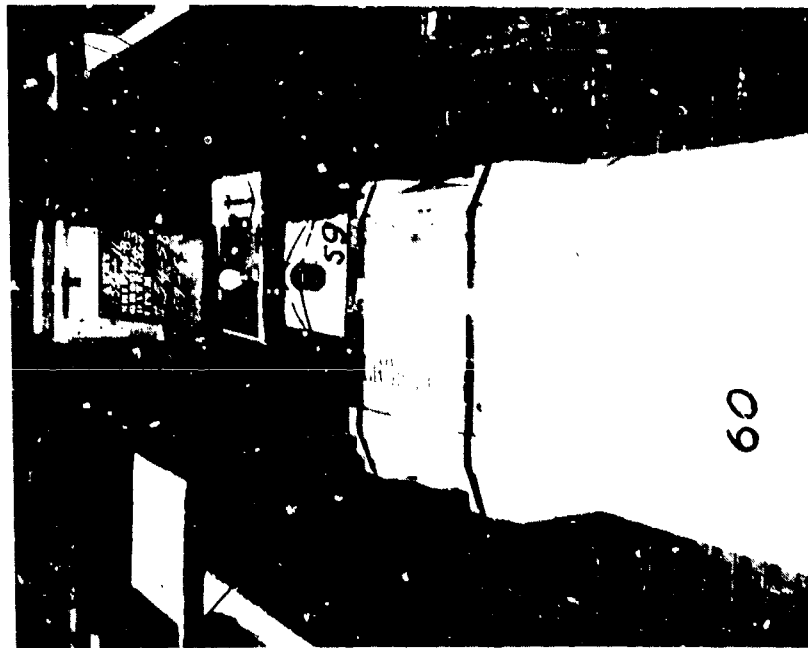


Fig. 299 - YOG 83 - Method of displaying
Item 58, 59, and 60.

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on the side nearest the blast had been scorched and blown away. The tape was scorched but otherwise undamaged. Some of the paint was blown from the metal end toward the blast. On the LST 52, the filter container was slightly scorched on the blast side and dented by the straps. No damage was apparent on the remaining LST's.

l. Fuze, P.D., M48A2, w/o Booster (Item #60). Forty-eight fuzes were displayed in a wooden box, Fig. 290. On the YOG 83, Fig. 299 and Fig. 301, the box was scorched on the side and end facing the blast. The top and rope handle were slightly scorched. The cleats on the top were badly scorched. The markings on the two sides were obliterated but those on the lid were legible. The box was shifted away from the blast almost an inch. On the LST 52, the box was scorched on part of the blast side. It was partially masked by the adjoining item. Both tie-down straps were broken. On the LST 661, the box was slightly scorched but the markings were still legible. No damage resulted on the other LST's.

m. Fuze, P.D., M52A1, w/Booster (Item #61). One fuze was displayed bare on a sheet metal plate, Fig. 302. On the YOG 83, no effects from the bomb were noted. The fuze was corroded due to rain. No damage was apparent on the remaining LST's.

n. Fuze, P.D., M52A1, w/Booster (Item #62). One fuze was displayed in a fiber container, Fig. 302. On the YOG 83, Fig. 303 and Fig. 304, one layer of paper on the container was scorched through and tattered on the side toward the blast. The fiber container, on the LST 52, was scorched on the blast side and dented by the straps. The fuze was still serviceable. No damage was apparent on the remaining LST's.

o. Fuze, P.D., M52A1, w/Booster (Item #63). Twenty-three fuzes were displayed in a wooden box, Fig. 305. On the YOG 83, Fig. 303 and Fig. 304, the rope handle was missing from one end prior to Test Able. After Test Able, the blast side and end were slightly scorched. The markings on these sides were only partially legible. The rope handle and the cleats toward the blast were also scorched. Mask marks caused by the straps were clearly visible on the scorched side. On the LST 52, the box was scorched on the blast side, but was still serviceable. No damage was apparent on the remaining ships.

p. Fuze, P.D., M52A1, w/o Booster (Item #64). One fuze was displayed bare on a sheet metal plate, Fig. 306.

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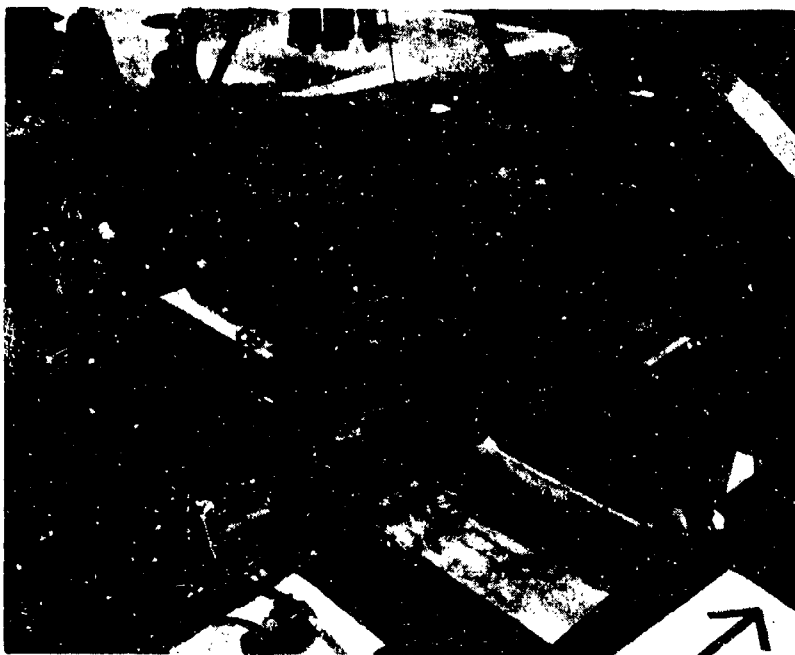


Fig. 301 - YOG 83 - View of charred boxes of Items 60 and 69 after Test Able.

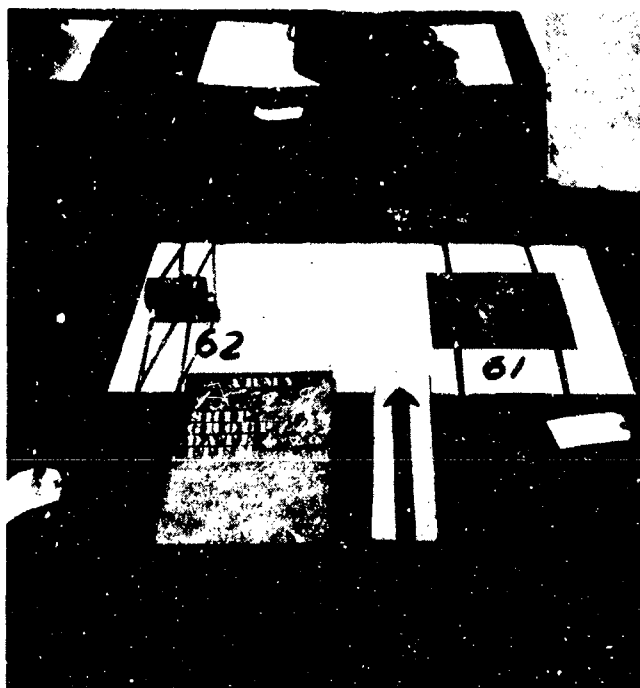


Fig. 302 - LST 661 - Method of securing Items 61 and 62.

266
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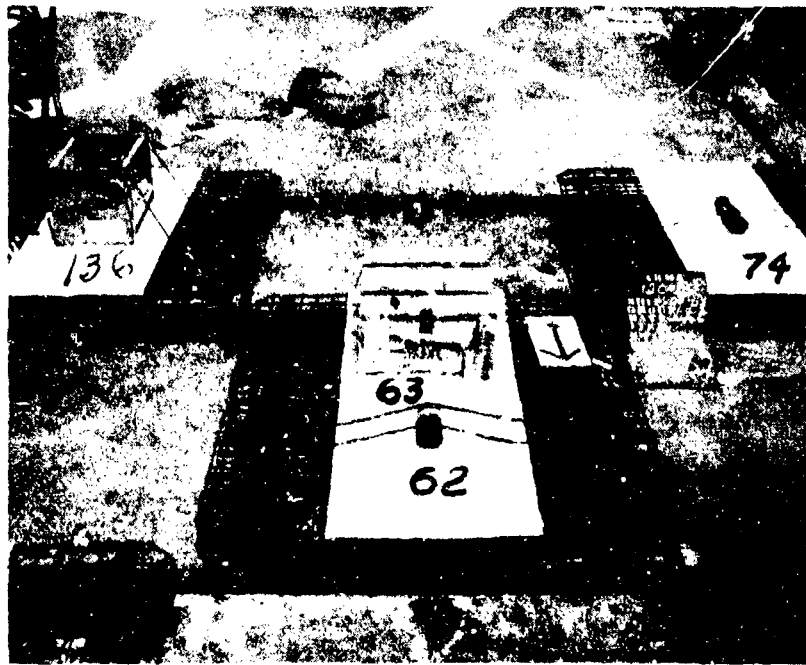


Fig. 303 - YOG 83 - Method of displaying Items 62, 63, 74, and 136.

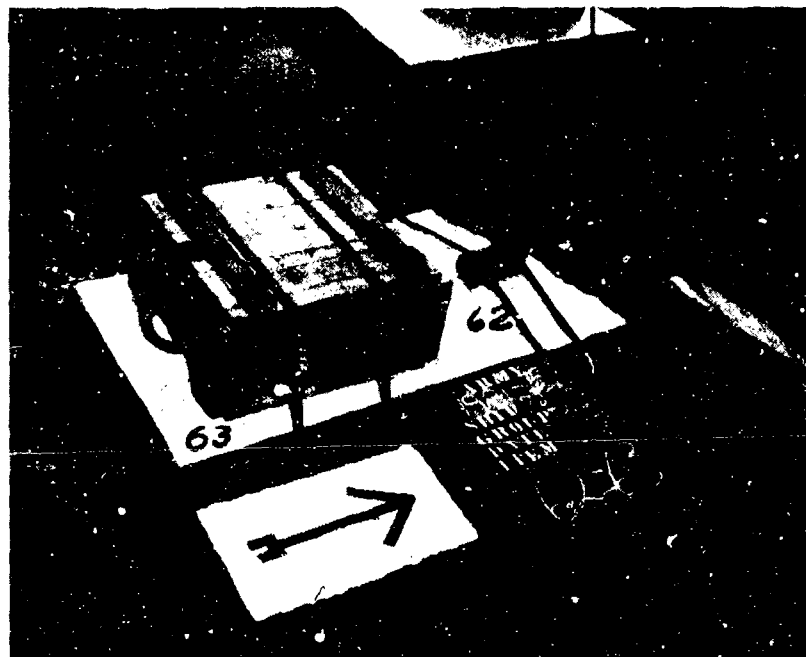


Fig. 304 - YOG 83 - The scorched container of Item 62 and the scorched box of Item 63 after Test Able.

267
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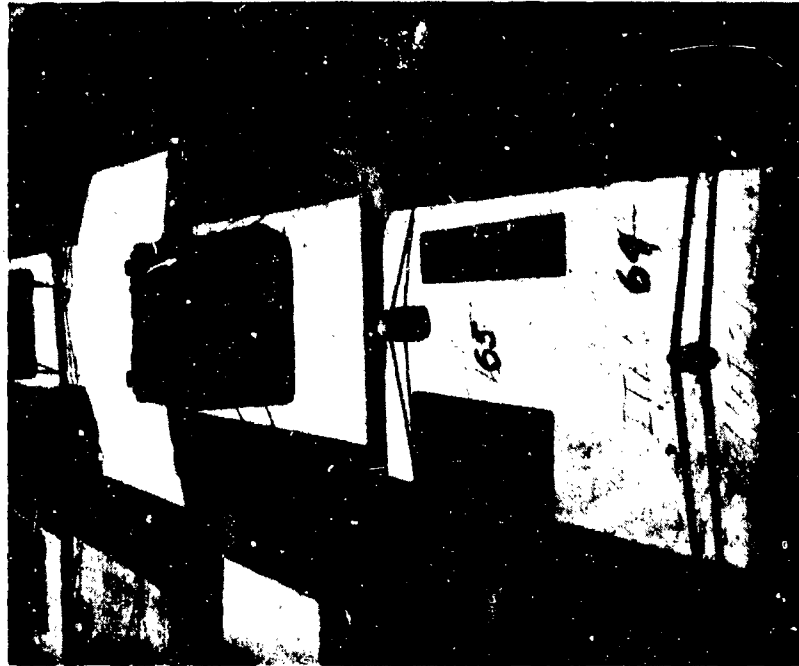


Fig. 306 - LST 661 - Method of displaying
Items 64 and 65.



Fig. 305 - LST 52 - Method of displaying
Item 63.

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On the YOG 83, Fig. 289 and Fig. 292, the only damage was a slight scorching on the rear of the booster cup. The plate on which the item was displayed was bent upward, by the blast. The fuze remained in position. On the LST 661, the item was masked by a beam. No damage was apparent on the remaining ships.

g. Fuze, P.D., M52A1, w/o Booster (Item #65). One fuze was displayed in a fiber container, Fig. 306. On the YOG 83, Fig. 289 and Fig. 292, the container paper and tape were scorched and peeled. The paint was scorched from the bottom of the container. All markings were obliterated. On the LST 52, Fig. 307, the container was crushed by a falling hatch cover. The container had been dented by the straps when securing it to the pallet. On the LST 661, the container had been struck by a wooden hatch cover but was undamaged. No damage was apparent on the other ships.

h. Fuze, P.D., M52A1, w/o Booster, (Item #66). Forty-eight fuses were displayed in their boxes, Fig. 308. On the YOG 83, Fig. 293, the top, side, and end nearest the blast were scorched. All markings were legible. The box was moved away from the blast approximately one inch. On the LST 52, and 661, the box was slightly scorched on the blast side, but the markings remained legible. No damage was apparent on the LSTs 545 and 220.

i. Fuze, T and SQ, M54 (Item #67). One fuze was displayed bare on a sheet metal plate, Fig. 309. On the YOG 83, Fig. 308 and Fig. 300, the black powder time train rings had burned, but the magazine charge was not damaged. No damage was apparent on any other ships.

j. Fuze, T and SQ, M54 (Item #68). One fuze was displayed in a metal container, Fig. 309. On the YOG 83, Fig. 308 and Fig. 300, the markings and paint on the can were burned off on the blast side. Parts of the markings were obliterated. The can was also rusted in the affected area. On the LST 52, the metal container was scorched on the blast side. No apparent damage was visible on the remaining LSTs.

k. Fuze, T and SQ, M54 (Item #69). Twenty three fuses were displayed in a wooden box, Fig. 309. On the YOG 83, Fig. 308 and Fig. 301, the box was scorched on the top and the side and end nearest the blast. The markings on these sides were barely legible. On the LST 52, the box was slightly scorched on the blast side. It was partially masked by the adjoining box. No damage

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Fig. 308 - YOG 83 - Method of securing
Items 66, 67, 68, and 69.



Fig. 307 - IST 52 - View after Test Able,
showing damage to Item 65
caused by a hatch cover.

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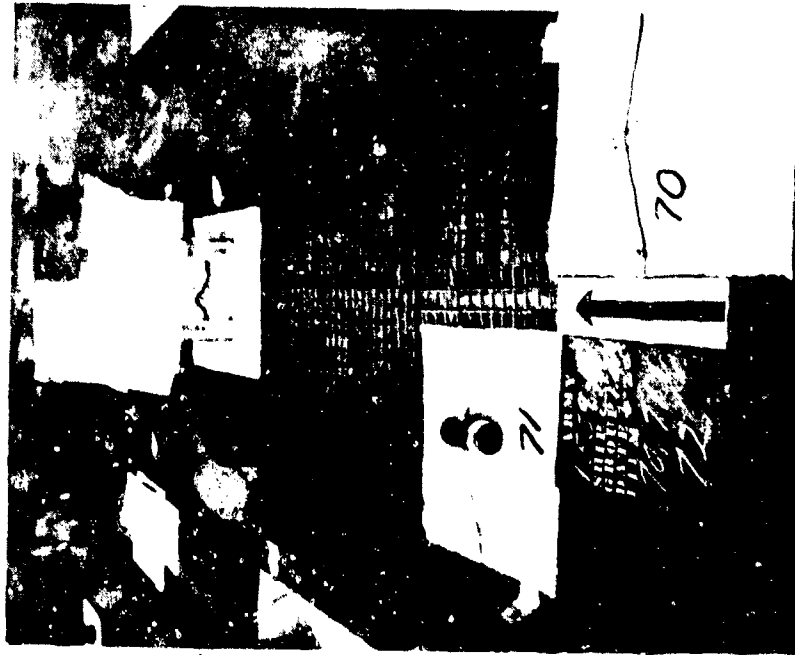


Fig. 310 - LST 661 - Method of displaying
Items 70 and 71.



Fig. 309 - LST 661 - Method of displaying
Items 67, 68, and 69.

271
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was apparent on the LSTs 220, 545 and 661.

y. Fuze, T and SQ, M55A3, w/Booster, M21A4 (Item #70). One fuze was displayed bare on a sheet metal plate, Fig. 310. On the YOG 83, Fig. 295, the black powder time train rings functioned but the booster did not. There was a slight corrosion on the fuze and booster due to rain. No damage was visible on the remaining LSTs.

y. Fuze, T and SQ, M55A3, w/Booster, M21A4 (Item #71). One fuze was displayed in a fiber container, Fig. 310. On the YOG 83, Fig. 295 and Fig. 311, the container was slightly scorched on the side toward the blast. The tape was torn in one place, but was still serviceable. Only that part of the nomenclature sticker which was under the steel strapping remained. There was no movement of the item and it was still serviceable. On the LST 52, the container was scorched on the blast side. It had been bent by the straps attaching it to the pallet. No damage was apparent on the remaining LSTs.

x. Fuze, T and SQ, M55A3, w/Booster, M21A4 (Item #72). Twenty three fuzes were displayed in a wooden box, Fig. 312. On the YOG 83, Fig. 295 and Fig. 311, the box was partially scorched on the side and end nearest the blast. Fifty percent of the markings on these sides were not legible. The scorching was the only visible damage caused by the blast. The box was moved approximately 3/4" in the direction of the blast. On the LST 52, Fig. 313, the box was scorched on the blast side and the straps were broken. The item was still serviceable. No damage was apparent on the remaining LSTs.

z. Fuze, VT, T76E6, w/Booster (Item #73). One fuze was displayed bare on a sheet metal plate, Fig. 314. On the LST 52, the wax was partially melted. The felt washer and booster were scorched on the blast sides. No damage was apparent on the other ships.

g. Fuze, VT, T76E6, w/Booster (Item #74). One fuze was displayed in a metal can, Fig. 314. On the YOG 83, Fig. 303 and Fig. 315, about 25% of the nomenclature and painting was scorched from the can. On the LST 52, the can was scorched on the blast side and dented by the straps. No damage was apparent on the remaining LSTs.

22. Fuze, VT, T76E6, w/Booster (Item #75). Ten fuzes were displayed in a metal box, Fig. 314. On the YOG 83, the box was slightly rusted in spots due to salt water corrosion. No effects from the bomb were noted on this or the remaining three ships.

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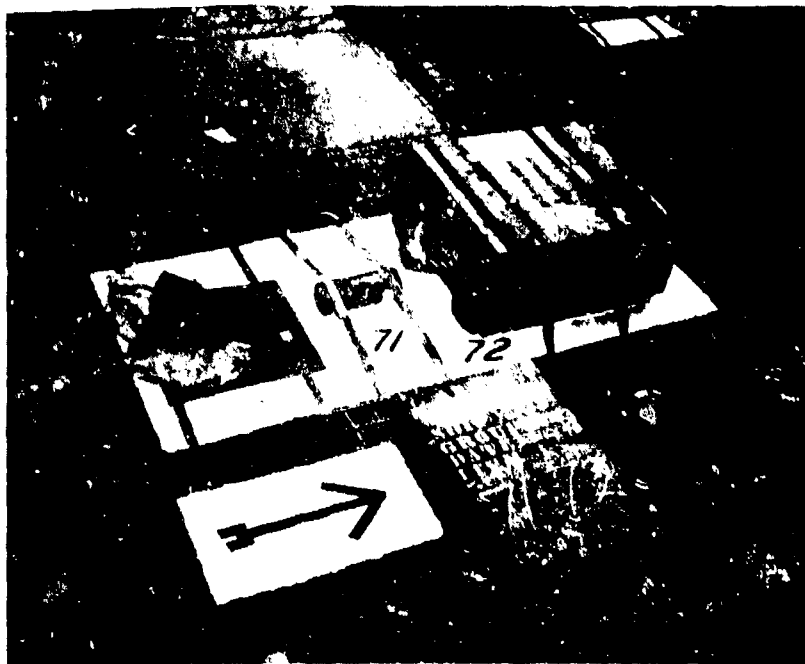


Fig. 311 - YOG 83 - Damage to Items 71 and 72 after Test Able.

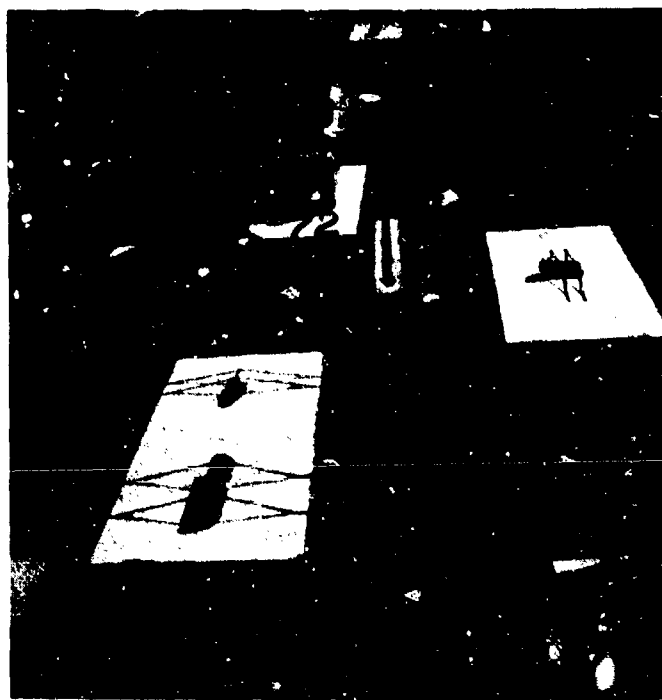


Fig. 312 - LST 52 - Method of securing Item 72.

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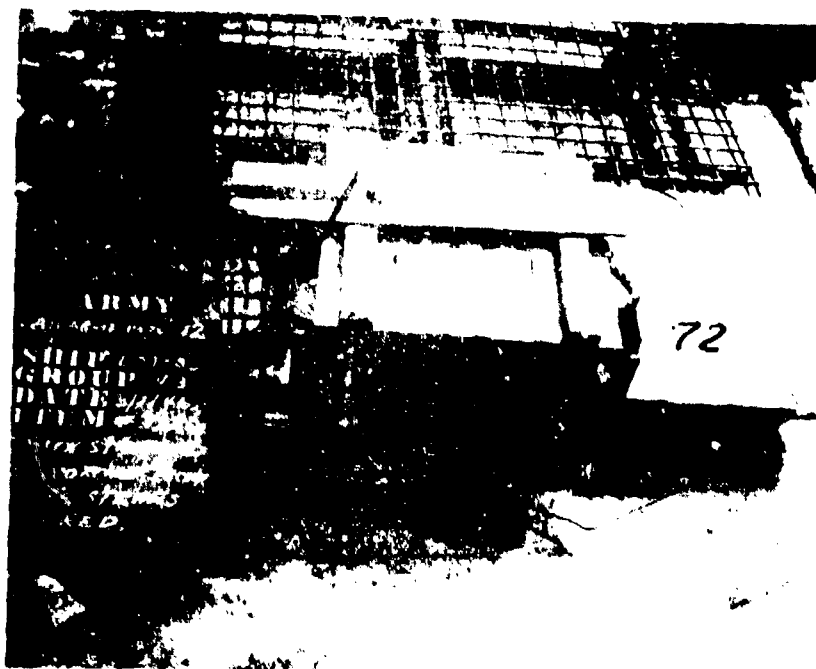


Fig. 313 - LST 52 - View of Item 72 after Test Able showing mask marks and broken strapping.

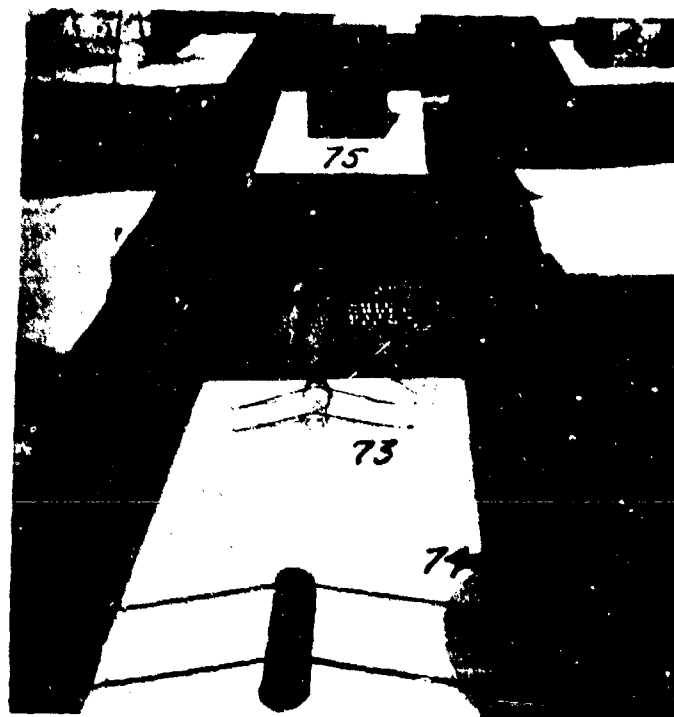


Fig. 314 - LST 661 - Method of securing Items 73, 74, and 75.

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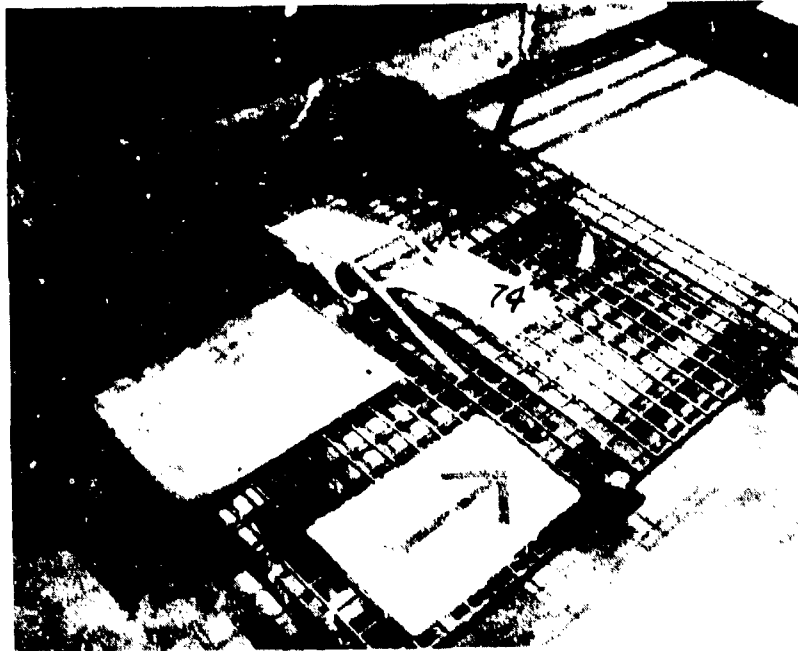


Fig. 315 - YOG 83 - Damage to Item 74 after Test Able.

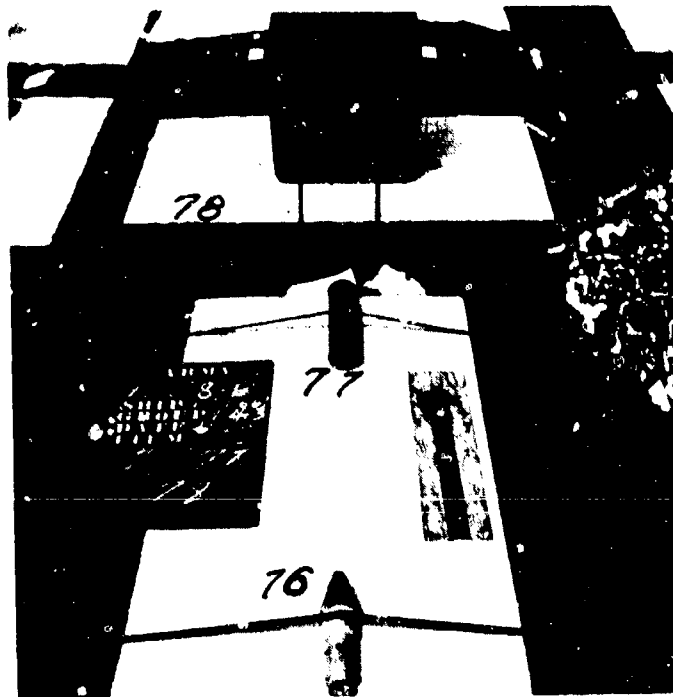


Fig. 316 - LST 661 - Method of securing Items 76, 77, and 78.

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bb. Fuse, VT, T76E6, w/o Booster (Item #76). One fuse was displayed bare, Fig. 316. On the YOG 83, none was displayed. On the LST 52, Fig. 317 and Fig. 318, part of the wax covering on the nose, was scraped off by a foreign object. The wooden booster plug and felt ring were scorched. The wax on the nose was partially melted. No damage was apparent on the remaining LSTs.

gg. Fuse, VT, T76E6, w/o Booster (Item #77). One fuse was displayed in a metal can, Fig. 316 and Fig. 317. No fuse was displayed on the YOG 83. On the LST 52, the can was slightly scorched on the side facing the blast and was dented by the straps. This container, on the LST 661, was damaged by a piece of hatch cover which was thrown on it by fire fighters. No damage was caused by the bomb. The fuse inside the container was not damaged. No damage was apparent on the remaining two LSTs.

dd. Fuse, VT, T76E6, w/o Booster. (Item #78). Ten fuses were displayed in a metal box, Fig. 316 and Fig. 317. No fuses were displayed on the YOG 83. On the LST 661, the box was slightly scorched but the markings remained legible and the box was serviceable. No damage was apparent on the two remaining LSTs.

ee. Fuse, Rocket, B.D., Mk146, w/Booster (Item #79). One fuse was displayed bare on a sheet metal plate, Fig. 319. On the LST 52, the inlet screen was scorched. No damage occurred on any other of the ships.

ff. Fuse, Rocket, B.D., Mk146, w/o Booster (Item #80). One fuse was displayed bare on a sheet metal plate. On the YOG 83, Fig. 320, the inlet screen was partially burned off by the blast. The gasket was unserviceable because of bending and twisting. No damage was apparent on the other ships.

4. FUSES, BOMB.

a. Fuse, Bomb, Nose, AN-M103A1, w/Booster (Item #110). One fuse was displayed bare on a sheet metal plate, Fig. 321. On the YOG 83, the fuse was corroded by rain but there was no apparent primary damage. On the remaining ships there was no apparent damage.

b. Fuse, Bomb, Nose, AN-M103A1, w/Booster (Item #111). This fuse was displayed in a metal can, Fig. 322. On the YOG 83, Fig. 323 and Fig. 324, the side and end of the can was scorched. The scorched area was approximately 3" x 6". The scorched area was also slightly rusted. On the LST 52,

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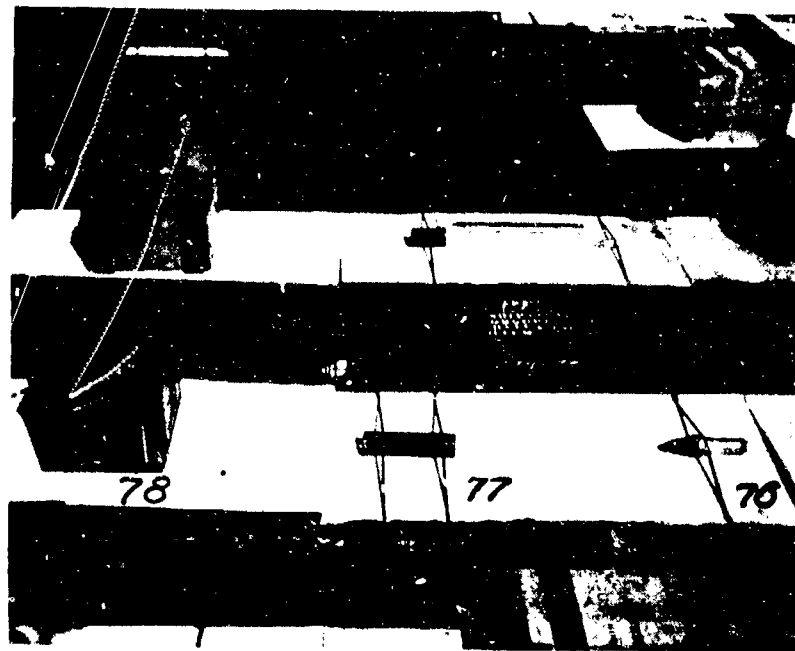


Fig. 317 - LST 52 - Method of securing Items 76, 77, and 78.

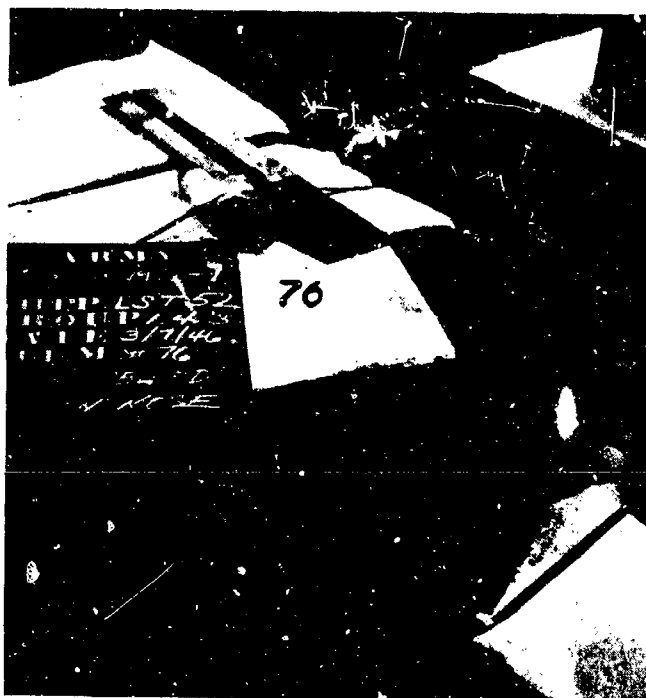


Fig. 318 - LST 52 - View after Test Able showing melted wax on nose of Item 76.

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Fig. 319 - LST 661 - Method of securing Item 79.

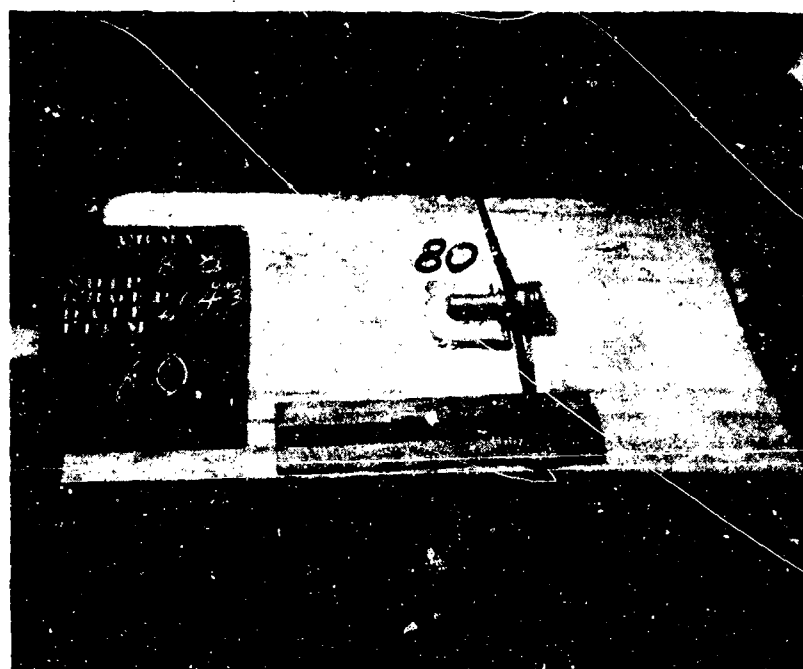


Fig. 320 - LST 661 - Method of securing Item 80.

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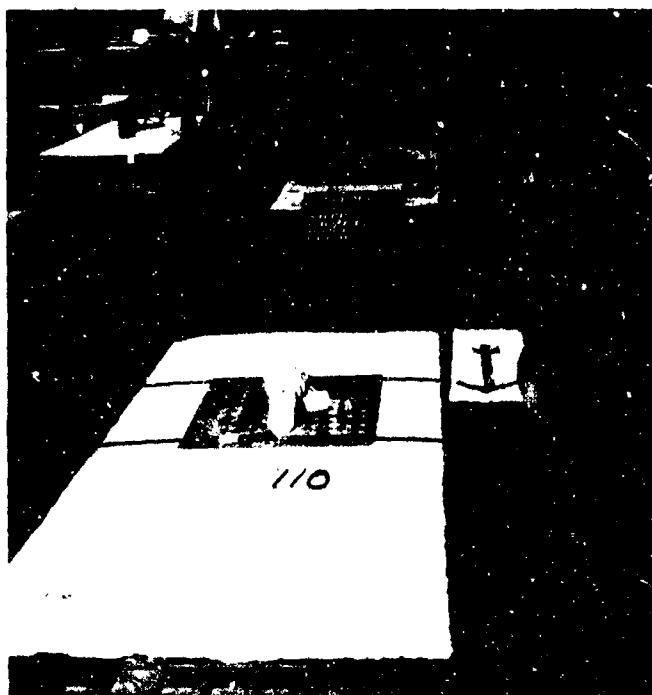


Fig. 321 - YOG 83 - Method of displaying
Items 88 and 110.

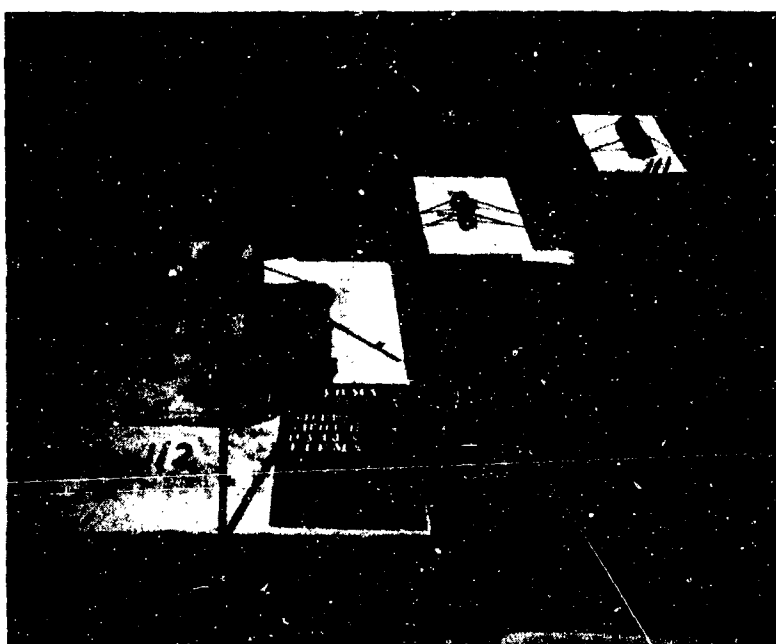


Fig. 322 - LST 661 - Method of securing Items
111 and 112.

279
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Fig. 323 - YOG 83 - Method of securing Items 111 and 116.

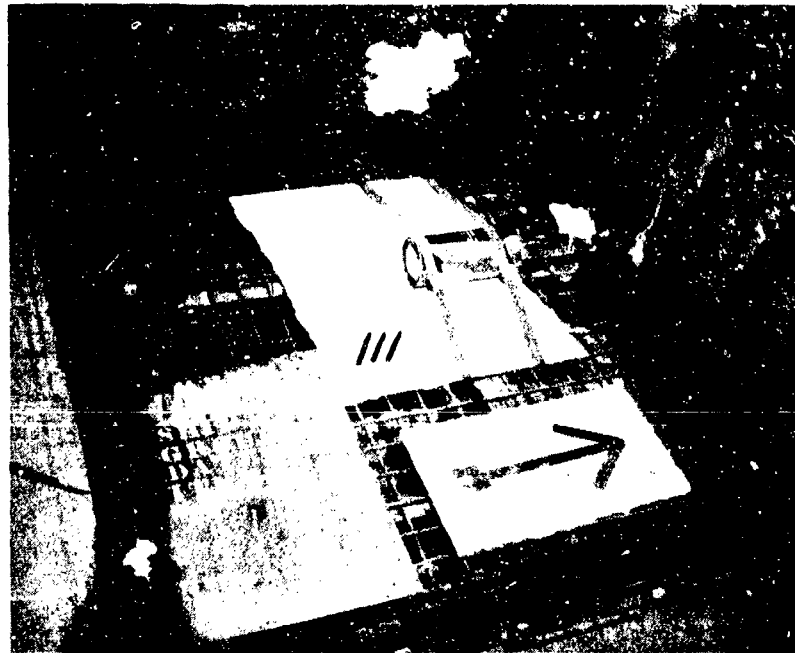


Fig. 324 - YOG 83 - Damage to Item 111 after Test Able.

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the container was scorched on the blast side but was serviceable. On the remaining ships, there was no apparent damage.

g. Fuse, Bomb, Nose, AN-M103A1, w/Booster, (Item #112). Twenty-three of these fuses were displayed in a wood box, Fig. 312. On the YOG 83, Fig. 325 and Fig. 326, the box was scorched on the blast side and end and partially on the top. The exposed rope handle was also scorched. The markings on the scorched side and end were obliterated but those on the top were legible. The box was shifted approximately 1-1/2" by the blast. The box was scorched on the LST 52, but was still serviceable. On the LST 661, the box was slightly scorched. All markings on the side of the box directly exposed to the blast were obliterated. On the remaining ships, there was no damage apparent.

h. Fuse, Bomb, Nose, AN-M103A1, w/o Booster (Item #113). One fuse was displayed bare on a sheet metal plate, Fig. 327. On the YOG 83, the fuse had been corroded by rain. On the LSTs 52, 661, 220 and 545, there was no apparent damage.

i. Fuse, Bomb, Nose, AN-M103A1, w/o Booster (Item #114). This fuse was displayed in a metal container, Fig. 328. On the YOG 83, Fig. 329 and Fig. 330, the can was badly damaged by an unknown flying object. The can was not damaged by the blast itself. It appears to have been scorched over an area of 2" x 4-1/2" on the blast side. The base of the can was also scorched. Fifty percent of the markings were obliterated. No damage was sustained on the remaining ships.

j. Fuse, Bomb, Nose, AN-M103A1, w/o Booster (Item #115). Twenty-three of these fuses were displayed in a wood box, Fig. 331. On the YOG 83, Fig. 332 and Fig. 333, the end and side exposed to the blast were completely scorched. The top was partially scorched. The markings on the end were illegible. Those on the side and top were only partially obliterated. The rope was frayed, scorched, and blown loose from the exposed cleat. The box was scorched on the blast side on the LST 52. On the LST 661, the box was slightly scorched but the markings were legible. No damage was apparent on the LSTs 220 and 545.

k. Fuse, Flare, M.T., M11A2, w/Booster (Item #116). One fuse was displayed bare, Fig. 334. On the YOG 83, it was corroded by rain, but no primary damage was apparent

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Fig. 325 - YOG 83 - Method of displaying Items 112, 125, and 127.

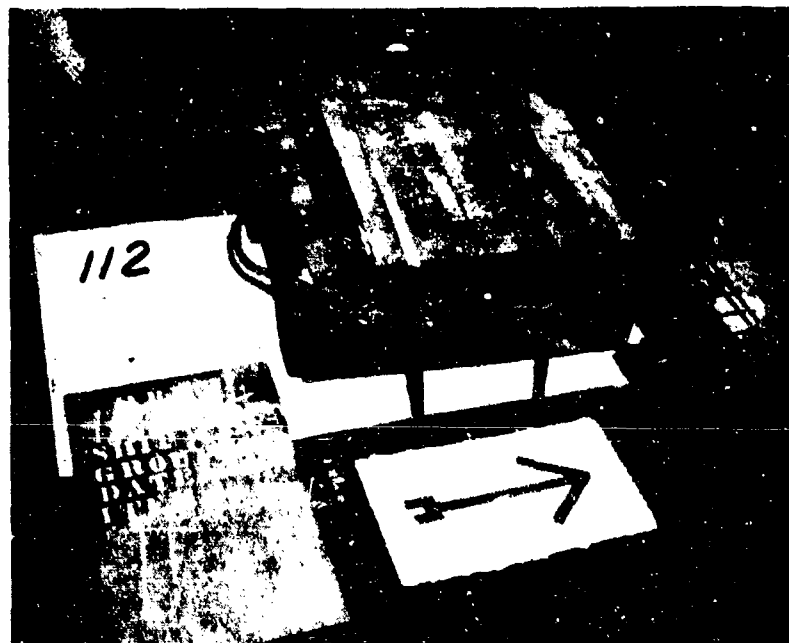


Fig. 326 - YOG 83 - Damage to Item 112 after Test Able.

282
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Fig. 327 - LST 220 - Method of securing Item 113.

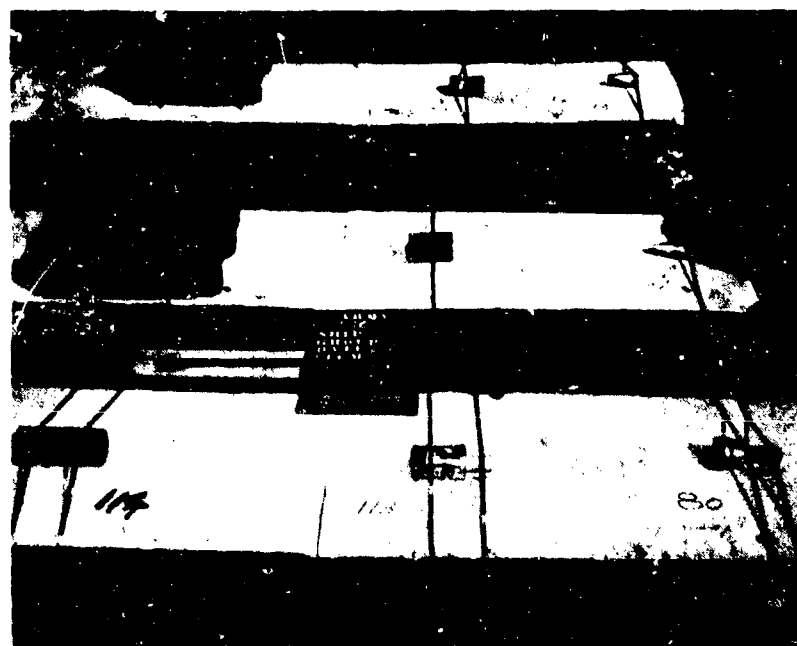


Fig. 328 - LST 52 - Method of displaying Item 114.

283
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Fig. 329 - YOG 83 - Method of displaying Items 114 and 123.



Fig. 330 - YOG 83 - Damage to Items 114 and 123 after Test Able.

284
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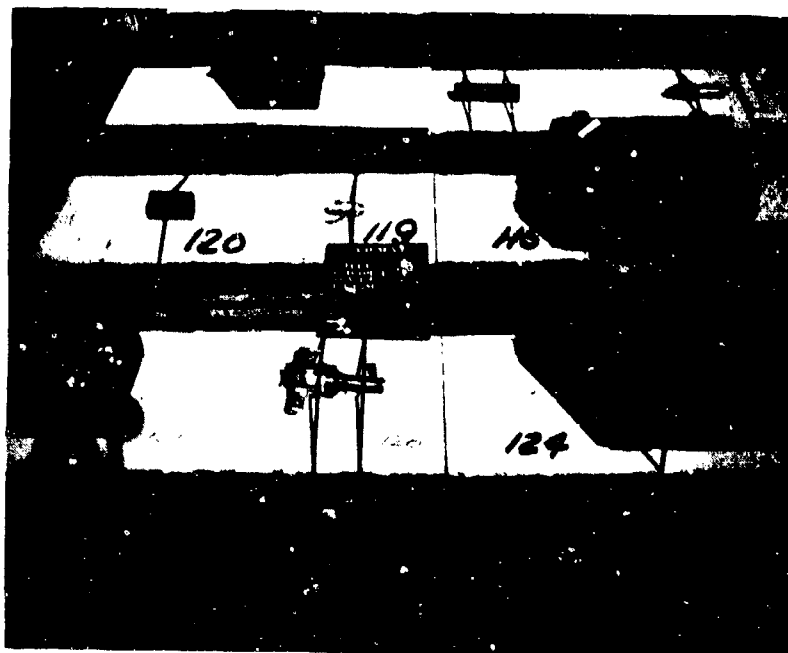


Fig. 331 - LST 52 - Method of displaying Items 115, 119, 120 and 124.

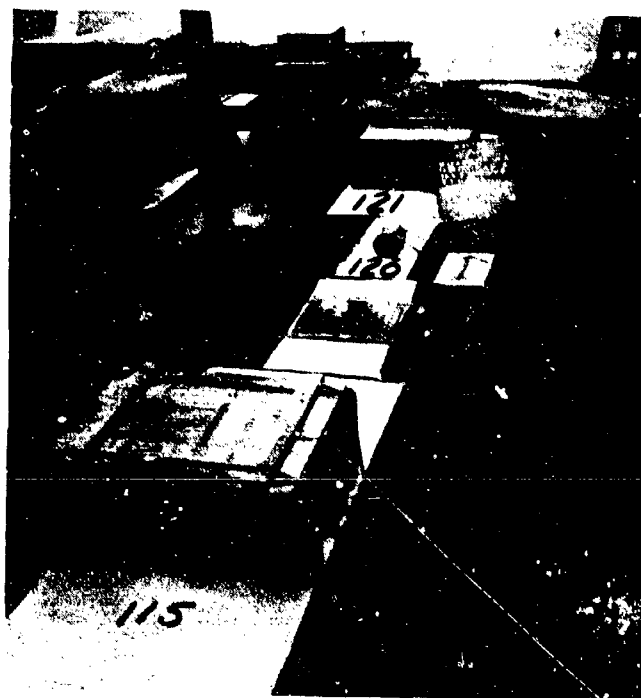


Fig. 332 - YOG 83 - Method of securing Items 115, 120, and 121.

285
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Fig. 333 - YOG 83 - Damage to Item 115 after Test Able.



Fig. 334 - IST 52 - Method of securing Items 88, 116, and 117.

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on this or the remaining ships.

h. Fuse, Flare, M.T., M111A2, w/Booster (Item #117). This item was displayed in a metal can, Fig. 334. On the YOG 83, Fig. 335 and Fig. 336, the paint was burned from the blast side of the can over an area approximately 1-1/2" x 3". The base of the can was also slightly scorched. The scorched area on the side was also rusted. The markings were partially scorched out. On the LST 52, the container was scorched on the blast side. It was dented by the straps, when secured to the pallet. No damage resulted on the other ships.

i. Fuse, Flare, M.T., M111A2, w/Booster (Item #118). Twenty-three of these fuzes were displayed in a wooden box, Fig. 337. On the YOG 83, Fig. 323 and Fig. 338, the blast side and end were scorched. The markings on the side were illegible, but those on the end were legible because the rope masked them. The box was shifted approximately 1/4" by the blast. On the LST 52, the box was scorched on the blast side but was still serviceable. On the LST 661, the box was also slightly scorched. The markings were legible. No damage was apparent on the remaining ships.

j. Fuse, Flare, M.T., M111A2, w/o Booster (Item #119). One fuse was displayed bare on a metal plate, Fig. 331. On the YOG 83, the fuse was corroded due to rain. No primary damage was sustained on this or any of the other target ships.

k. Fuse, Flare, M.T., M111A2, w/o Booster (Item #120). One fuse was displayed in a metal can, Fig. 331. On the YOG 83, Fig. 332 and Fig. 339, the paint was slightly scorched on the bottom of the can and in an area approximately 1-1/2" x 3" on the side toward the blast. The stencilling was slightly obliterated by the heat. On the LST 52, the can was scorched on the blast side. It was dented by the straps, when secured to the pallet. No damage was apparent on the remaining ships.

l. Fuse, Flare, M.T., M111A2, w/o Booster (Item #121). Twenty-three fuzes were displayed in a wood box, Fig. 340. On the YOG 83, Fig. 332 and Fig. 339, the top was slightly scorched, obliterating the markings slightly. The end nearest the blast was slightly scorched, but the markings were legible. The blast side was badly scorched, no markings were legible. The box was shifted approximately 1/3". The box was scorched on the blast side, on the LST 52. On the LST 661, the box was slightly scorched, but the markings were legible. No damage was apparent

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Fig. 335 - YOG 83 - Method of securing Item 117.

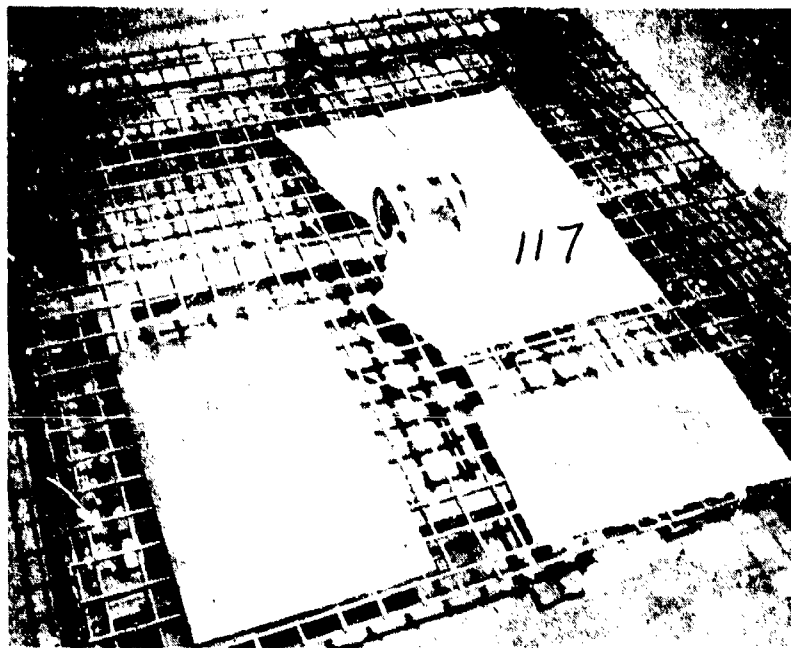


Fig. 336 - YOG 83 - Damage to Item 117 after Test Able.

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Fig. 337 - LST 661 - Method of securing Item 118.

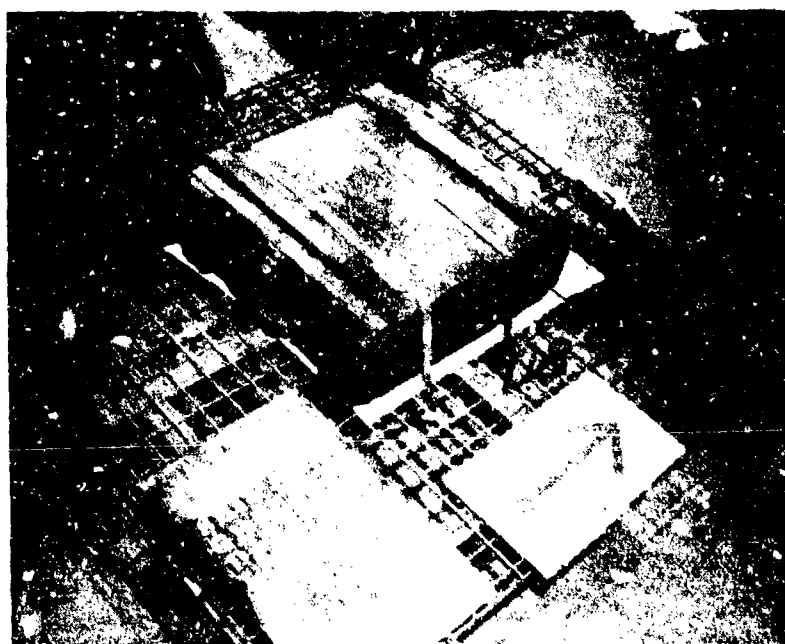


Fig. 338 - YOG 83 - Damage to Item 118 after Test Able.

289
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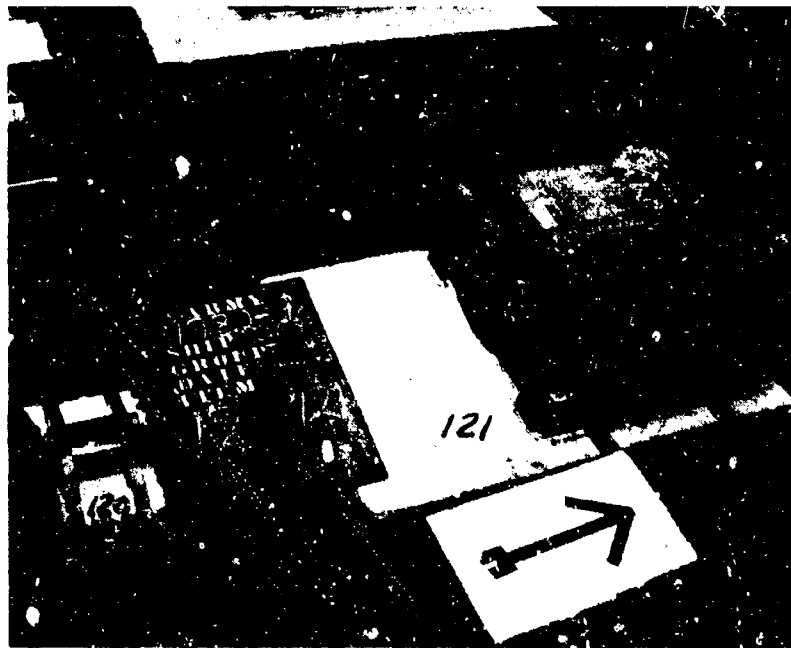


Fig. 339 - YOG 83 - Damage to Items 120 and 121 after Test Able.



Fig. 340 - LST 52 - Method of securing Items 121, 122, and 132.

290
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on the remaining ships.

m. Fuse, Bomb, Tail, M112 (Item #112). One fuse was displayed bare on a metal plate, Fig. 340. On the YOG 83, slight corrosion was noted but there was no primary damage. The stem tube was slightly discolored. No damage was apparent on the remaining ships.

n. Fuse, Bomb, Tail, M112 (Item #123). One fuse was displayed in a metal can, Fig. 341. On the YOG 83, Fig. 329 and Fig. 330, the lid of the can had been displaced 1/4". The end and side of the can exposed to the blast were slightly scorched. Rust was found around the base of the can. On the LST 52, the can was slightly scorched on the blast side. It had been dented when it was secured to the pallet. No damage was apparent on the remaining ships.

o. Fuse, Bomb, Tail, M112 (Item #124). Twenty-three of these fuses were displayed in a wood box, Fig. 331. On the YOG 83, Fig. 217 and Fig. 329, only very slight scorching of the blast side of the box resulted. The markings remained legible. The box had been moved 1" by the blast. The box was scorched on the blast side on the LST 52 even though it was partially masked. The front tie-down strap was broken. On the LST 661, the box was slightly scorched, but the markings were still legible. No damage was reported on the remaining ships.

p. Fuse, Bomb, Nose, VT, T51M1 (M166) w/Booster (Item #125). One fuse was displayed bare on a metal plate, Fig. 342. On the YOG 83, Fig. 325 and Fig. 343, the plastic head and wing facing the blast were scorched. The body was slightly corroded by rain. All safety pins were in place, but parts of their tags were burned off. The body was scorched and the warning on the wing was discolored. The fuse body and plastic head were scorched on the top, on the LST 52. No damage was apparent on the remaining ships.

q. Fuse, Bomb, Nose, VT, T51M1, (M166) w/Booster. (Item #126). One fuse was displayed in a cardboard carton, Fig. 344. On the YOG 83, Fig. 345, the blast side was scorched and the markings were gone. The carton was moved 1/2" by the blast. On the LST 52, the carton was scorched on the blast side. No damage was apparent on the remaining ships.

r. Fuse, Bomb, Nose, VT, T51M1 (M166) w/Booster (Item #127). Four fuses were displayed in a wood box,

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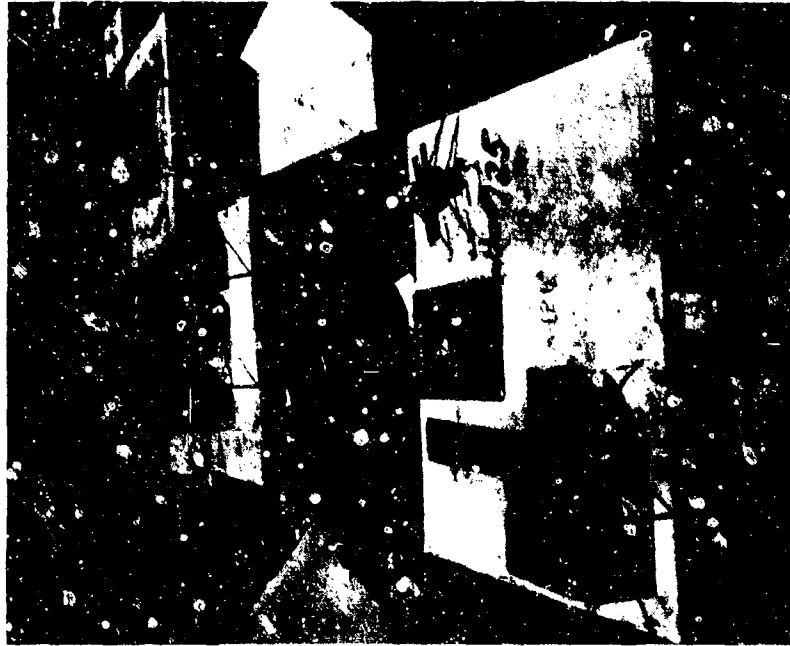


Fig. 342 - LST 661 - Method of displaying
Item 125.

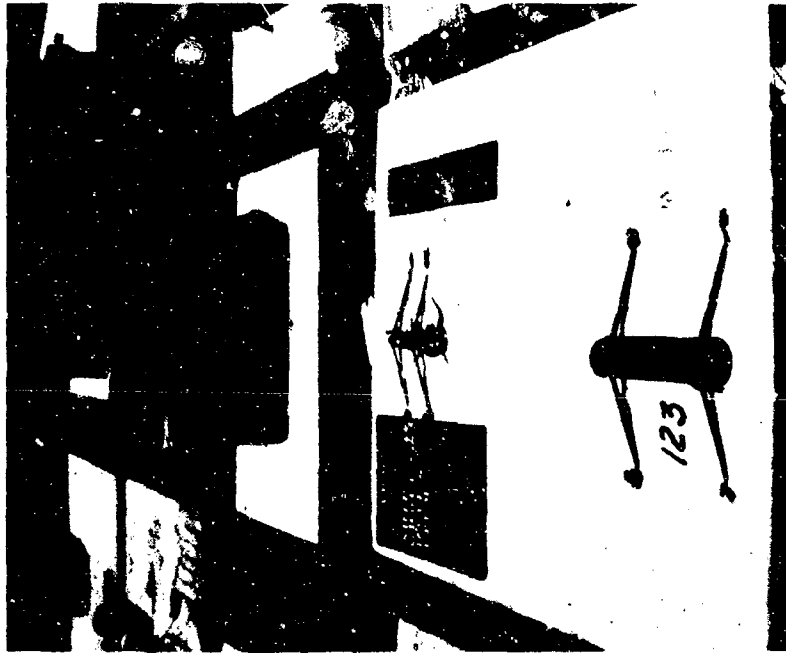


Fig. 341 - LST 661 - Method of securing
Item 123.

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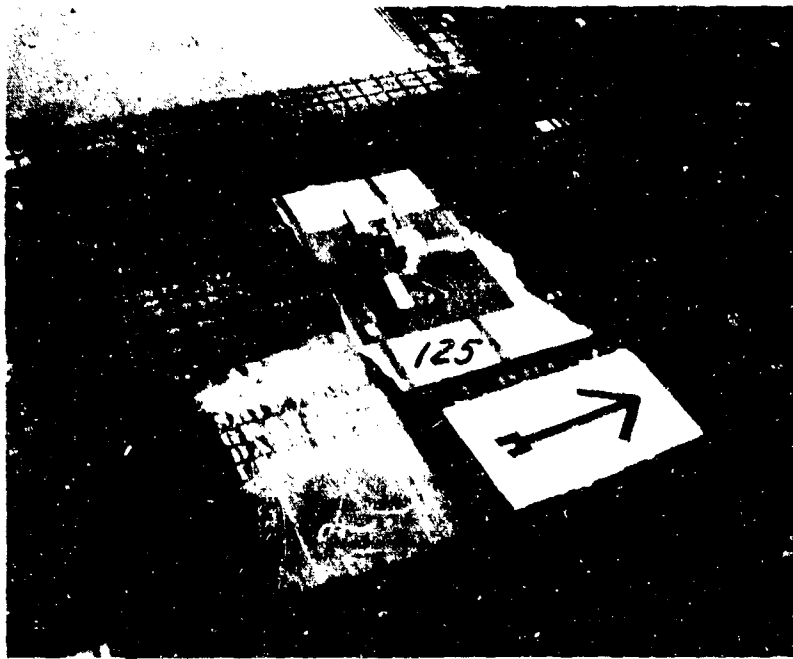


Fig. 343 - YOG 83 - Damage to Item 125 after Test Able.

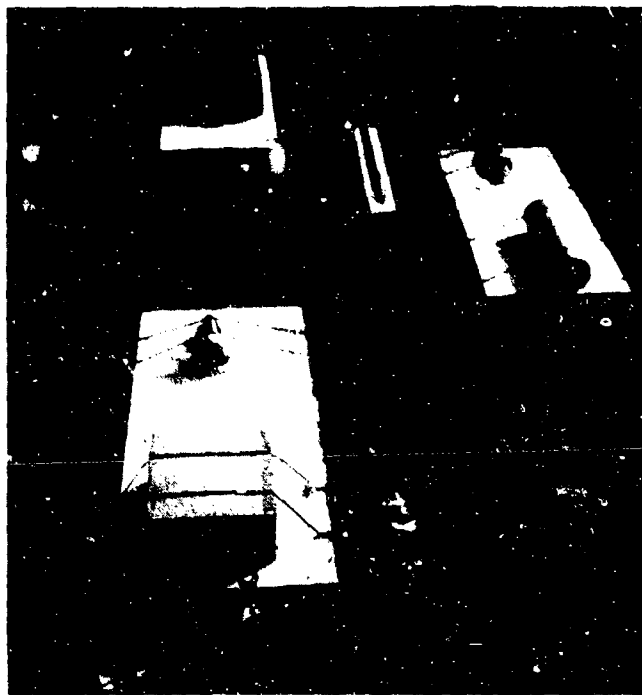


Fig. 344 - LST 52 - Method of displaying Item 126.

293
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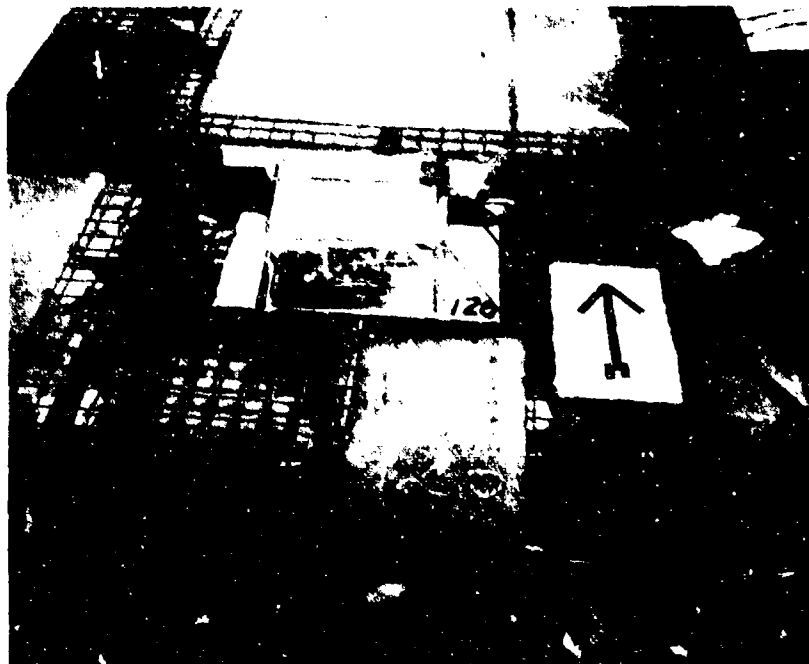


Fig. 345 - YOG 83 - Damage to Item 126 after Test Able.

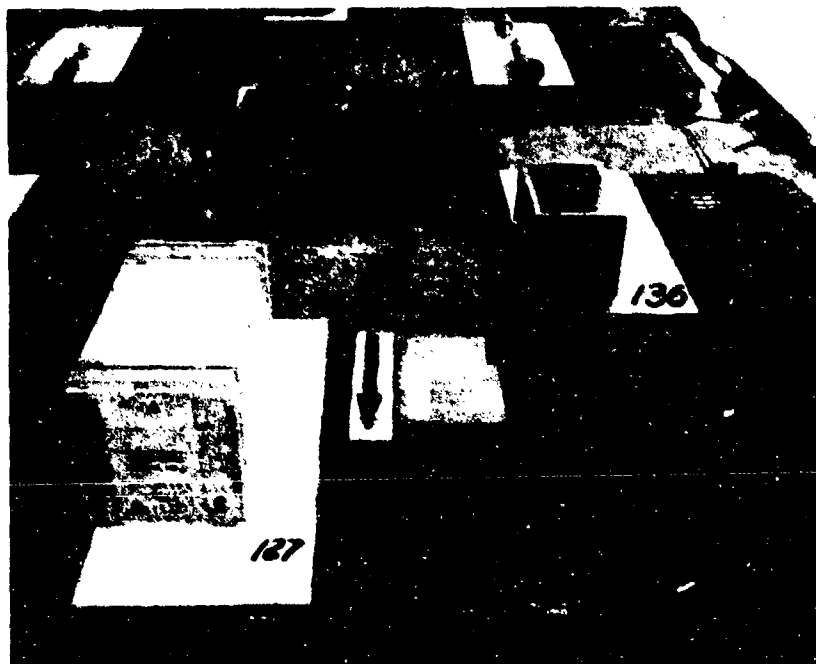


Fig. 346 - LST 53 - Method of securing Items 127 and 136.

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Fig. 346. On the YOG 83, Fig. 325 and Fig. 347, the exposed side was scorched and half of the markings were illegible. A small stone was driven approximately 3/16" into the box. The hardware on the same side of the box was scorched. On the LST 52, the box was scorched but remained serviceable. On the LST 661, the box was slightly scorched. No damage was apparent on the remaining ships.

g. Fuze, Bomb, Nose, VT, T51E1 (M166) w/o Booster (Item #128). One fuze was displayed bare, Fig. 348. On the YOG 83, the plastic head was scorched. The warning tag was only partially legible. The fuze was slightly corroded. On the LST 52, the plastic head was slightly melted. No damage was apparent on the other ships.

t. Fuze, Bomb, Nose, VT, T51E1 (M166) w/o Booster (Item #129). One fuze was displayed in a cardboard carton, Fig. 348. On the YOG 83 and the LST 52, the carton was scorched on the blast side. No damage was apparent on the remaining ships.

u. Fuze, Bomb, Nose, VT, T51E1 (M166) w/o Booster (Item #130). Four fuzes were displayed in a wood box, Fig. 348. On the YOG 83, Fig. 349 and Fig. 350, the box was scorched on the sides nearest the blast. On the LST 52, the box was scorched on the blast side, but was serviceable. No damage was apparent on the remaining ships.

v. Fuze, Bomb, Tail, T57 (Item #131). One fuze was displayed bare, Fig. 351. On the YOG 83, there was a slight corrosion and rust near the detonator on the body. On this and the other ships, there was no apparent primary damage.

w. Fuze, Bomb, Tail, T57 (Item #132). One fuze was displayed in a metal can, see Fig. 340. On the YOG 83, see Fig. 352 and Fig. 353, the paint and tape were scorched and peeled. The lid remained in place. On the LST 52, the can was dented by the tie-down straps. The can had been scorched. No damage was apparent on the remaining ships.

x. Fuze, Bomb, Tail, T57 (Item #133). Four fuzes were displayed in a box, Fig. 354. On the YOG 83, Fig. 355 and Fig. 356, the blast side and ends were extensively scorched. The top was lightly scorched. The markings were illegible on the side and end but were legible on the top. On the LST 52, the box was

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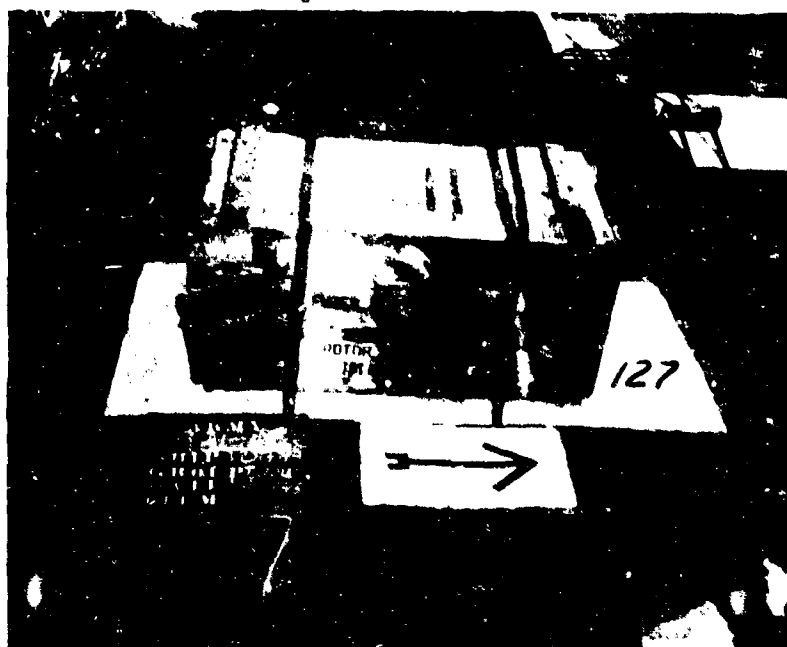


Fig. 347 - YOG 83 - Damage to Item 127 after Test Able.

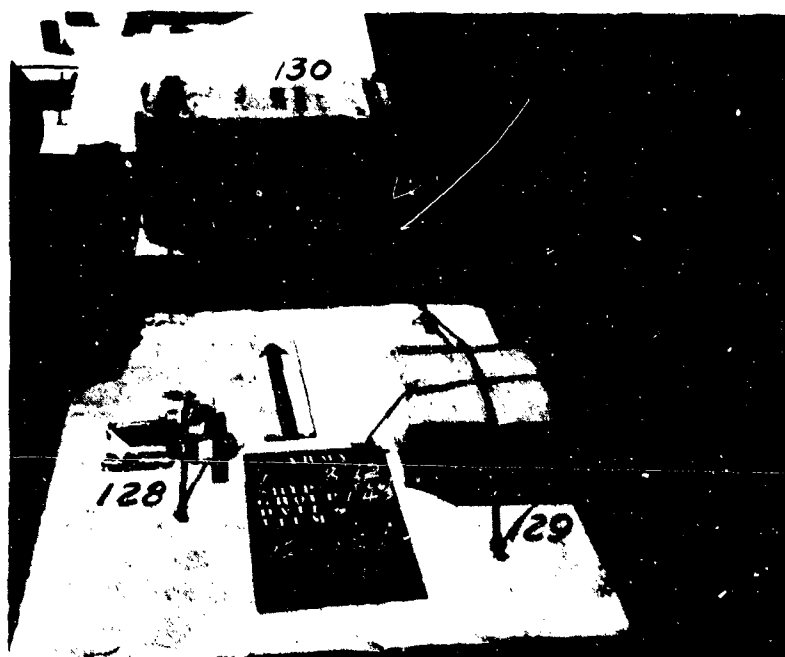


Fig. 348 - LST 661 - Method of securing Items 128, 129, and 130.

296
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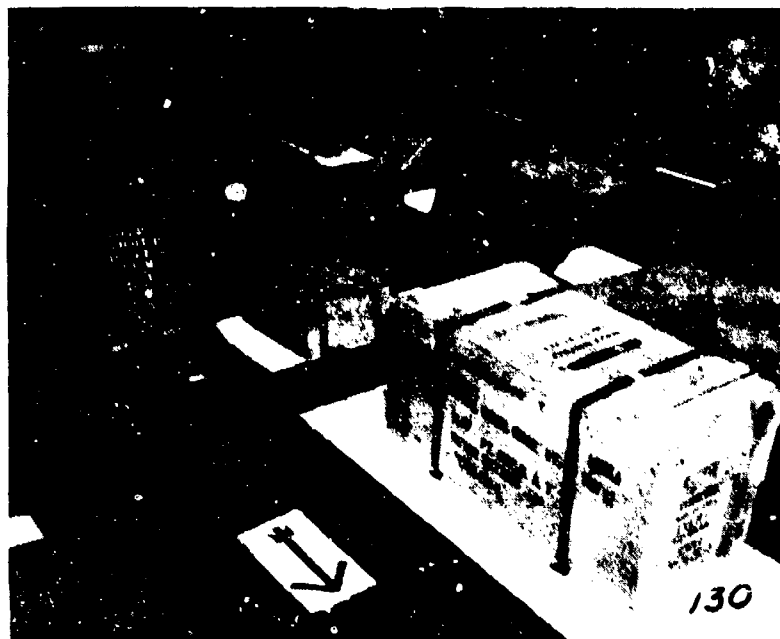


Fig. 349 - YOG 83 - Method of securing Item 130.

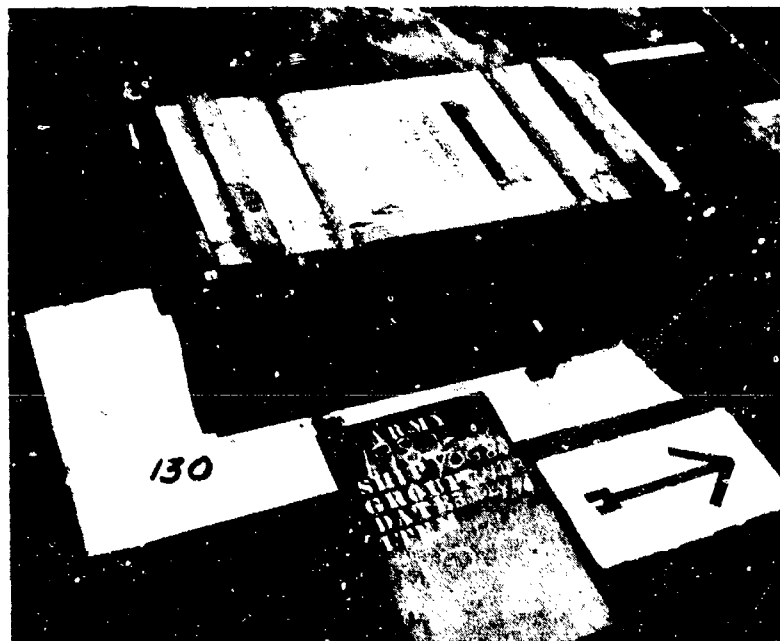


Fig. 350 - YOG 83 - Test Able damage to Item 130.

297
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Fig. 351 - LST 661 - Method of securing Item 131.

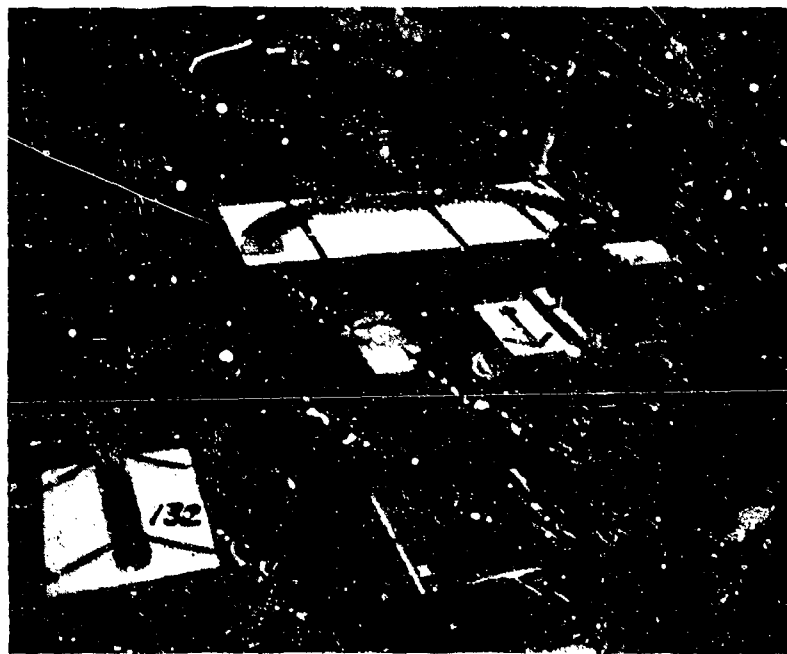


Fig. 352 - YOG 83 - Method of securing Item 132.

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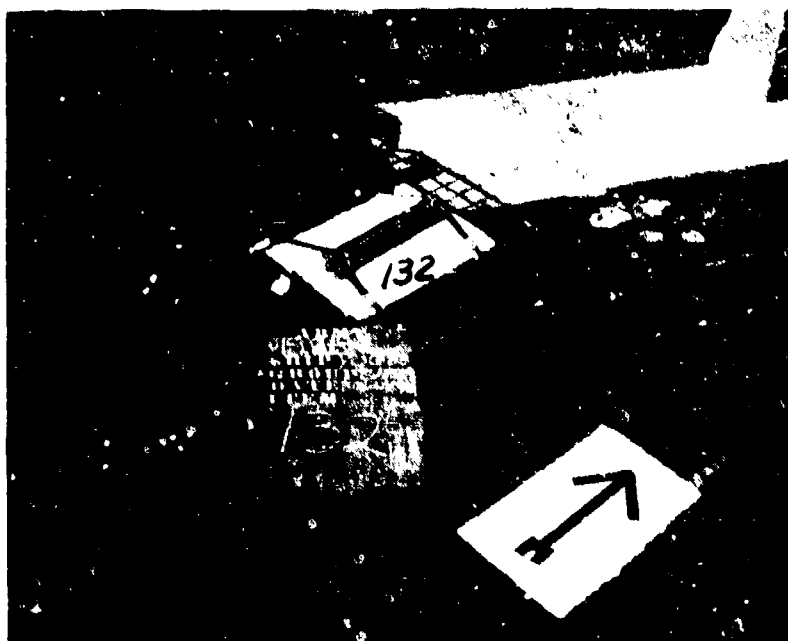


Fig. 353 - YOG 83 - Damage to Item 132 after Test Able.

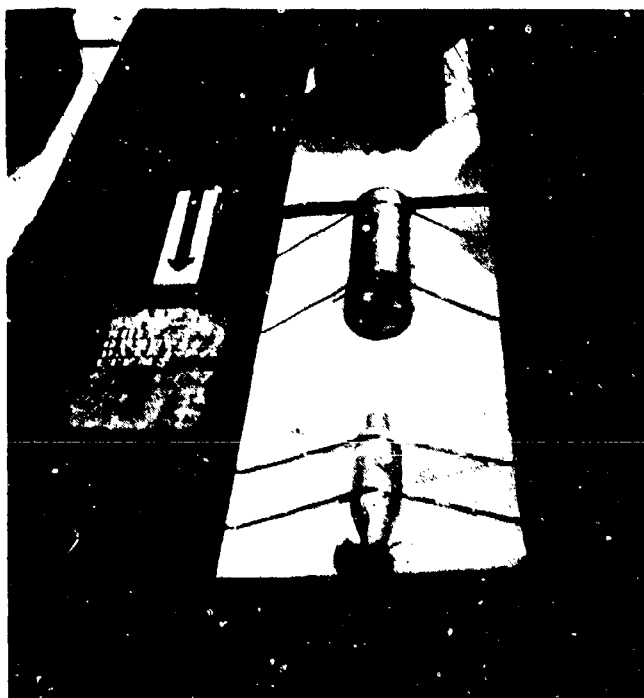


Fig. 354 - LST 52 - Method of securing Item 133.

299
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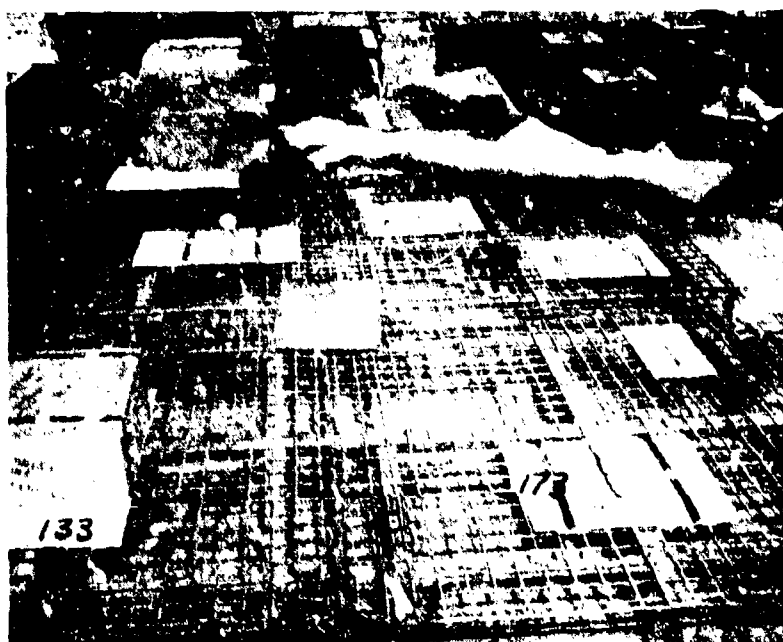


Fig. 355 - YOG 83 - Method of securing Items 133, 172, and 173.



Fig. 356 - YOG 83 - Damage to Items 133 and 173. after Test Able.

300
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partially scorched. It was partially masked by Item #24. No damage was apparent on the other ships.

y. Fuse, Bomb, Hydrostatic, Mk.230, w/Booster (Item #134). One fuse was displayed bare on a metal plate, Fig. 357. On the YOG 85, the metal ring around the warning tag was torn off. The top was slightly scorched. No other damage was sustained. On the LST 52, Fig. 358, the item was displaced. Damage to the asbestos on which it was displayed indicates that it was struck by a foreign object. The fuse was undamaged. No damage was apparent on the remaining ships.

z. Fuse, Bomb, Hydrostatic, Mk.230, w/Booster (Item #135). One fuse was displayed in a metal can, Fig. 357. On the YOG 83, asbestos matting was spattered on the end and side away from the blast. The can was rusted on the end. On the LST 52, the can was dented by the tie-down straps. No visible primary damage was sustained on this or any of the other target ships.

aa. Fuse, Bomb, Hydrostatic, Mk.230, w/Booster (Item #136). Two of these fuses were exposed in a metal crate, Fig. 346. On the YOG 83, Fig. 302 and Fig. 359, the end of the crate away from the blast was bulged outward 1/2". The far end of the right can was tilted upward 3" in the crate. The crate was also rusted slightly by rain. No damage was apparent on the remaining ships except that the crate had been dented in strapping it to the deck of the LST 52.

bb. Fuse, Bomb, Hydrostatic, Mk.230, w/o Booster (Item #137). One of these fuses was displayed bare, Fig. 360. On the YOG 83, the booster cup was corroded, but there was no primary damage to this item on any of the ships.

cc. Fuse, Bomb, Hydrostatic, Mk.230, w/o Booster (Item #138). One fuse was displayed in a metal can. On the LST 52, Fig. 361 and Fig. 362, the top of the can which was secured only with black tape, was scorched and partially blown off. No other damage was sustained. The item was masked by the vent shaft. On the remaining ships, no damage was apparent.

dd. Fuse, Bomb, Hydrostatic, Mk.230, w/o Booster (Item #139). Two of these fuses were displayed in a crate, Fig. 361. No damage from the bomb was apparent on any of the ships. On the LST 52, the crate had been dented in shipment. It was masked by Item #130.

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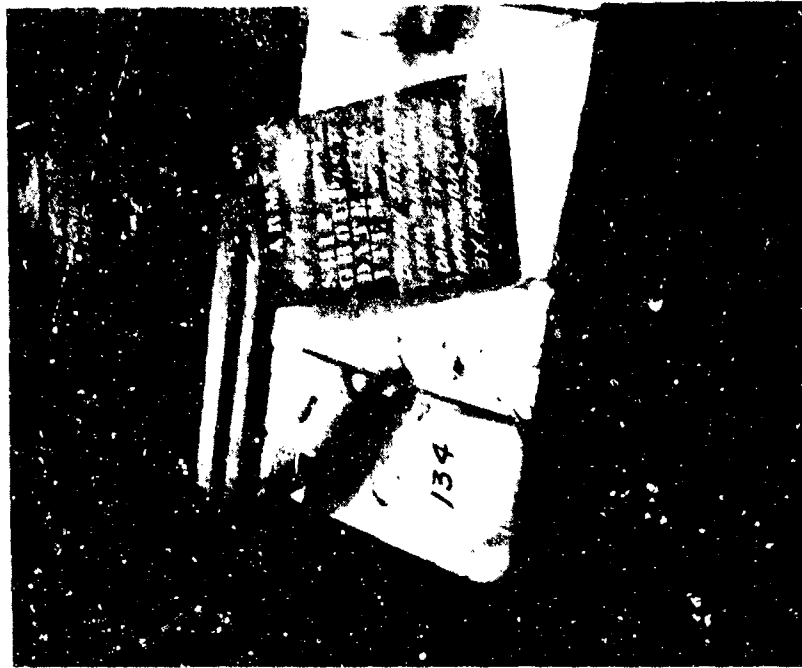


Fig. 358 - LST 52 - Damage to Item 134
after Test Able.



Fig. 357 - LST 661 - Method of securing
Items 134 and 135.

302
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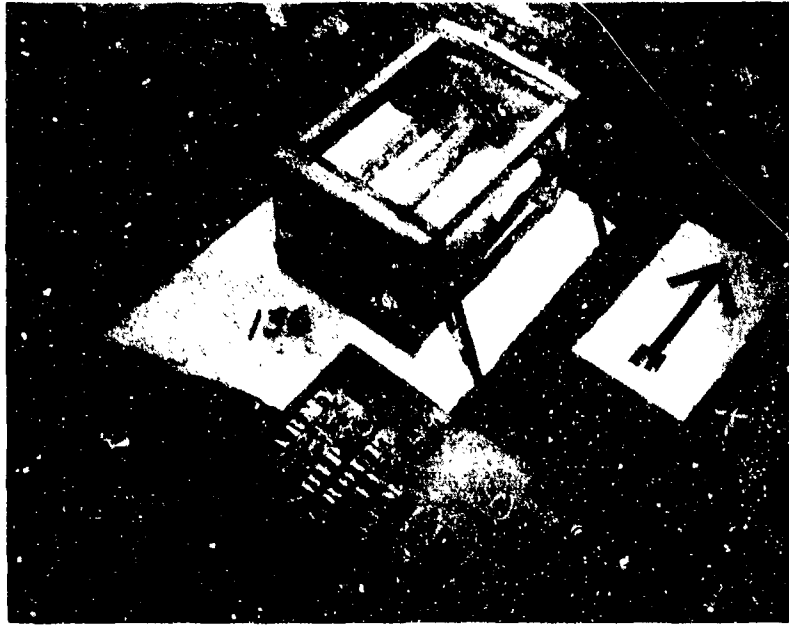


Fig. 359 - YOG 83 - Damage to Item 136 after Test Able.



Fig. 360 - LST 661 - Method of securing
Item 137.

303
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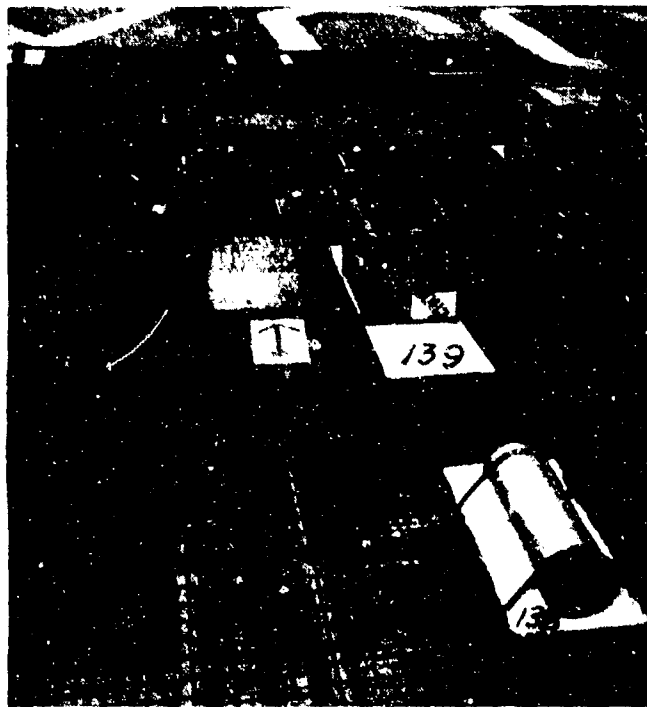


Fig. 361 - YOG 83 - Method of securing
Item 138 and 139.

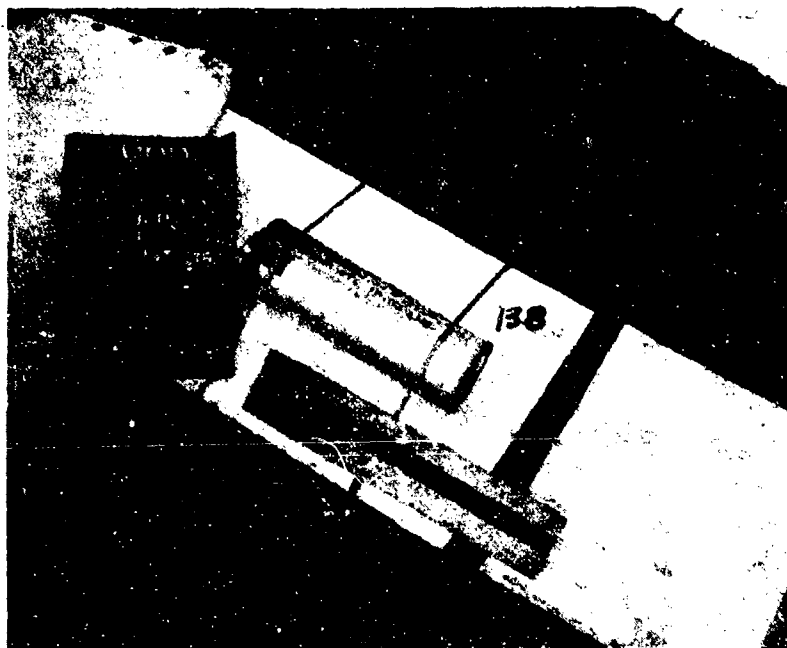


Fig. 362 - LST 52 - Damage to Item 138 after Test Able.

304
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5. ROCKET AMMUNITION.

a. Head, Rocket, HE, 7.2", T37, w/o Fuze (Item #81). One was displayed bare, Fig. 363. On the YOG 83, Fig. 364, rubber gasket between the motor adapter and the closure plug appeared to have been scorched and in so doing had discolored the adapter. There was rust on the front edge of the head. The head, on the LST 661, was masked. On all other ships no damage was apparent.

b. Head, Rocket, HE, 7.2", T37, w/o Fuze (Item #82). One was displayed in a wood box, Fig. 363. On the YOG 83, Fig. 364 and Fig. 365, one side was charred extensively, while the end was charred only slightly. Asbestos matting was spattered on the sides away from the blast. The box had shifted 1" with the blast. The lid had been displaced 3/8". A cleat on the severely scorched side was partially broken off. On the LST 52, the box was scorched on the blast side. Before Test Able, the lid was badly split. Some of the small pieces were missing. On the LST 661, the box was scorched on the side directly exposed to the blast. The markings on that side were obliterated. No damage was apparent on the LSTs 220 and 545.

c. Motor, Rocket, 2.25" MK3 (Navy) (Item #84). One motor was displayed bare, Fig. 366. On the YOG 83, the closing cap in the venturi was slightly scorched. The fins away from the blast were corroded. The shroud was spattered with asbestos on the side away from the blast. The item had shifted 3/8". On the LST 52, the motor was scorched on the side exposed to the blast. No damage was apparent on the LSTs 220, 545, and 661.

d. Motor, Rocket, 2.25", MK3 (Navy) (Item #85). Seven motors were displayed in a wood box, Fig. 367. On the YOG 83, the rear end, right side, and top were scorched and the markings were obliterated. The box was moved 1" by the blast. On the LST 52, Fig. 368, the box was scorched on the blast side and the box was moved 20" with the blast. The tie-down straps had been broken. On the LST 661, the box was scorched on the side directly exposed to the blast. The markings on that side were obliterated. No damage was apparent on the LSTs 220 and 545.

e. Rocket, Practice, AT, 2.36", M7A3 (Item #86). One rocket was displayed bare, Fig. 369. On the YOG 83, Fig. 286 and Fig. 370, the motor tube was scorched and rusted. The tape around the safety pin had been blown away. The head was slightly scorched and rusted in one spot on the side toward the bomb blast. The white.

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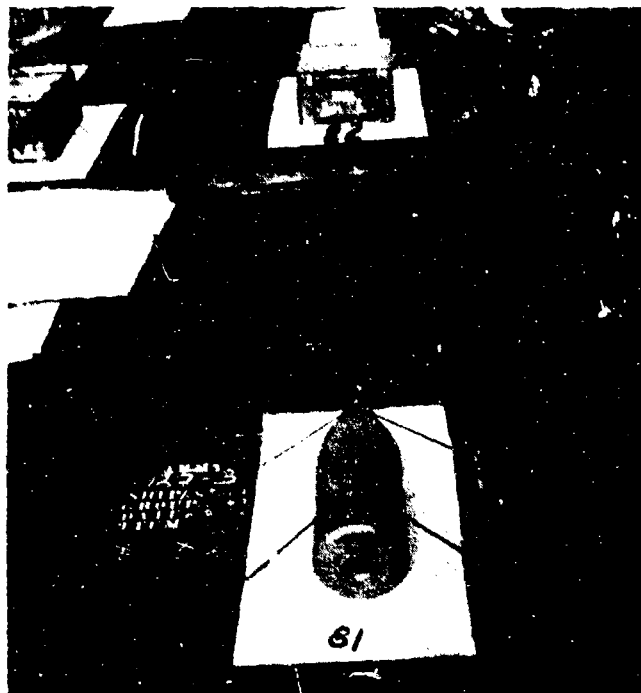


Fig. 363 - LST 661 - Method of securing Items 81 and 82.

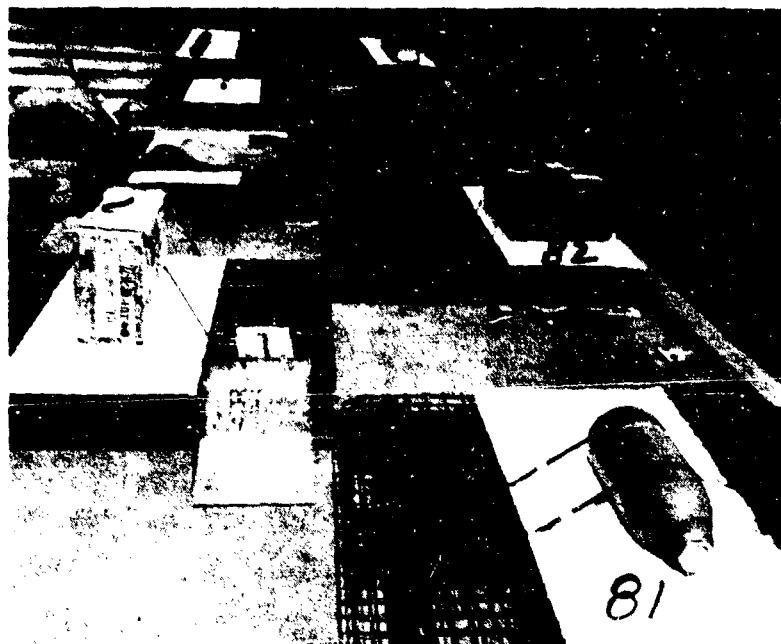


Fig. 364 - YOG 83 - Method of securing Items 81 and 82.

306

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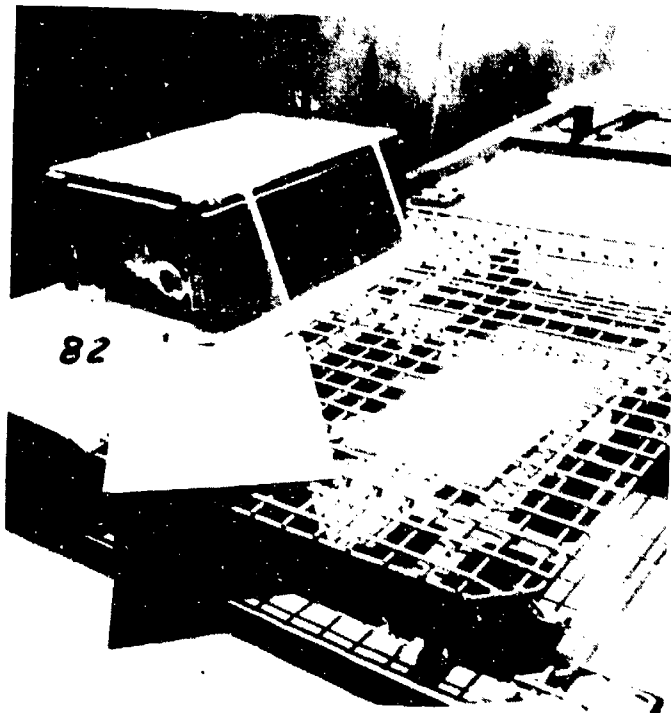


Fig. 365 - YOG 83 - Damage to Item 82
after Test Able.

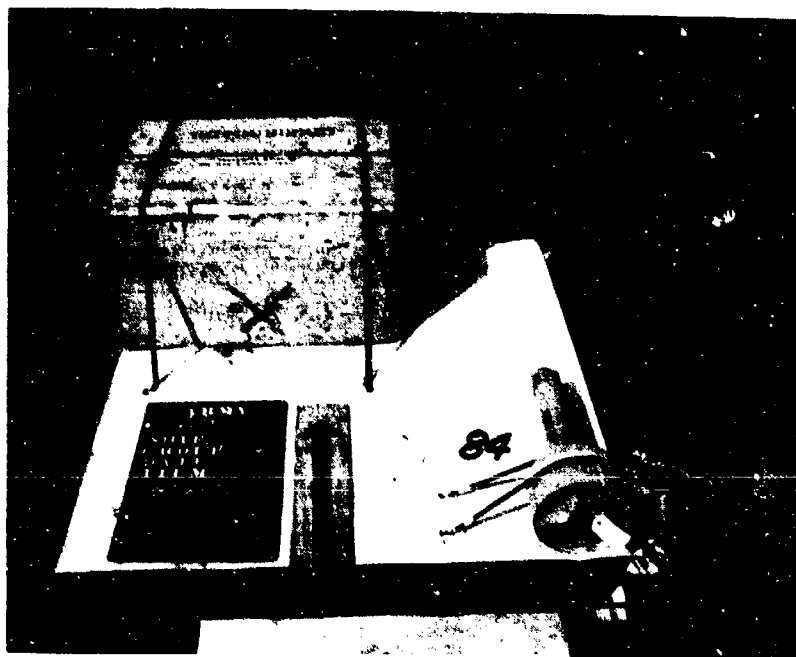


Fig. 366 - LST 661 - Method of securing Item 84.

307
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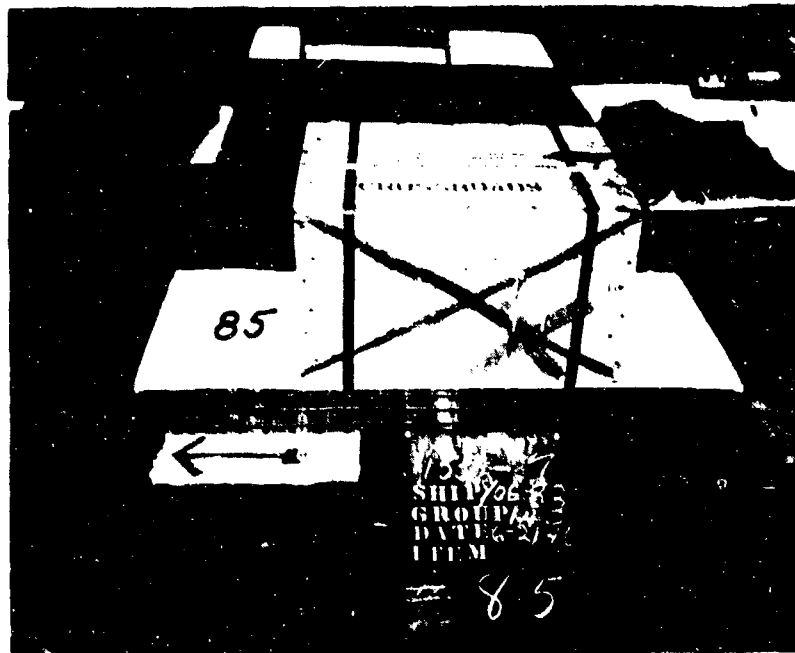


Fig. 367 - YOG 83 - Method of securing Item 85.

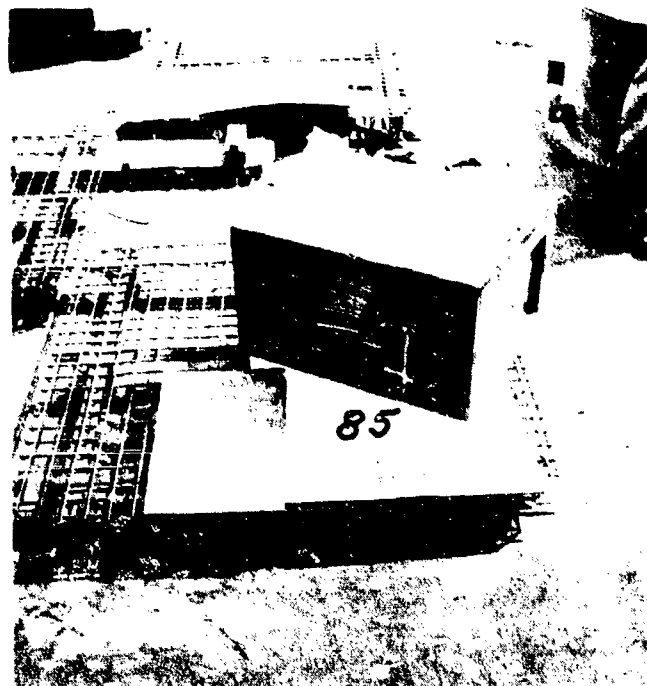


Fig. 368 - LST C2 - Damage to Item 85 after Test Able.

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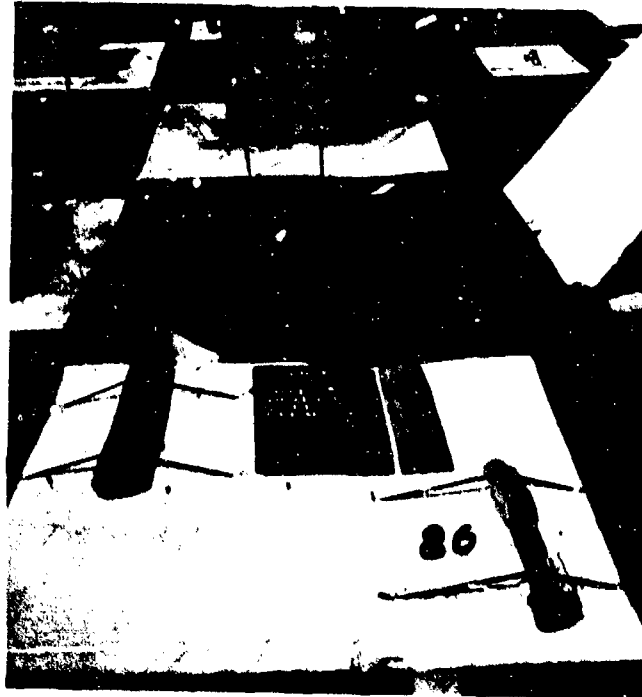


Fig. 369 - LST 661 - Method of securing Item 86.

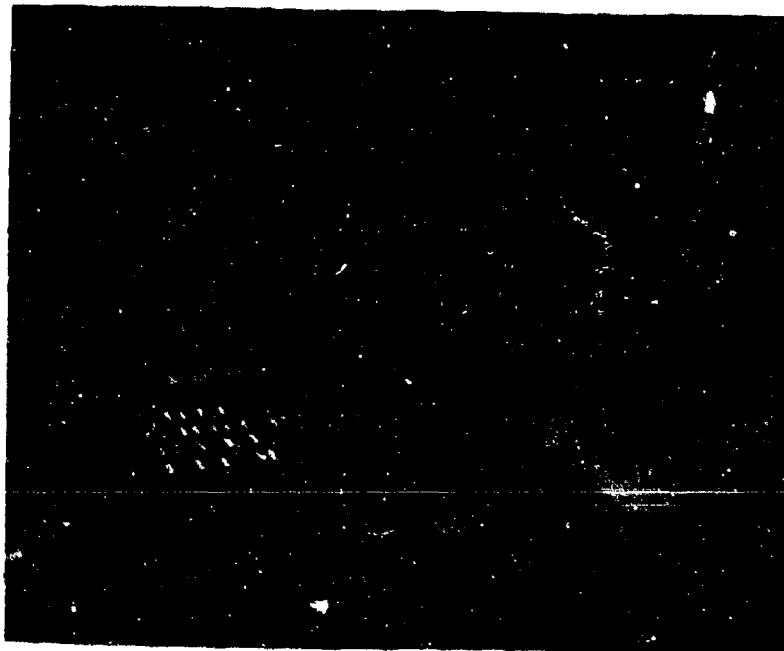


Fig. 370 - YOG 83 - Damage to Item 86 after
Test Able.

309
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stencilling was also slightly scorched. No damage was apparent on the remaining four ships.

f. Rocket, Practice, AT, 2.36", M7A3 (Item #87). One rocket was displayed in a fiber container, Fig. 371. On the YOG 83, Fig. 372 and Fig. 373, the container was moved to the left 3-1/2" by the blast. Two layers of fiber paper were torn and scorched on the side facing the blast. The exposed end of the container was devoid of paint. A section of the tape containing part of the nomenclature was torn from the side facing the blast. On the side away from the blast the tape was intact and the marking was legible. On the LST 52, Fig. 374, the fiber container was scorched on the blast side and dented by the straps. The item is serviceable but the markings were obliterated. No damage was apparent on the other ships.

g. Rocket, Practice, AT, 2.36", M7A3 (Item #88). Eighteen were displayed in a wood box, Fig. 334. On the YOG 83, Fig. 321 and Fig. 375, the box was moved 4" by the blast. The top was pushed forward 1" more than the bottom so that the box resembled a parallelogram. The nails holding the box together were bent. The nomenclature on the side and end was obliterated by scorching but that on the top was only partially obliterated. On the LSTs 52 and 661, the box was scorched on the blast side but was serviceable. No damage was apparent on the remaining LSTs.

h. Rocket, HE, AT, 2.36", M6A3F (Item #89). One Rocket was displayed here, Fig. 376. On the YOG 83, before the test, the stabilizer tube threads were rusty. After the test, the fins were rusted both inside and out. The stencilling was slightly scorched. On the LST 52, the item was unserviceable, because of shroud denting caused in strapping the rocket to the pallet. The rocket was partially masked from the blast by a ladder. No further damage resulted. No damage was apparent on any of the other ships.

i. Rocket, HE, AT, 3.36", M6A3F (Item #90). One round was displayed in a fiber container, Fig. 376. On the YOG 83, Fig. 377 and Fig. 378, the fiber container was scorched and peeled. The sealing tape had a slight tear but the nomenclature was legible. On the LST 52, the container was dented by the strapping. It was partially masked by a ladder. The item was scorched on the LST 661. No damage was apparent on the remaining ships.

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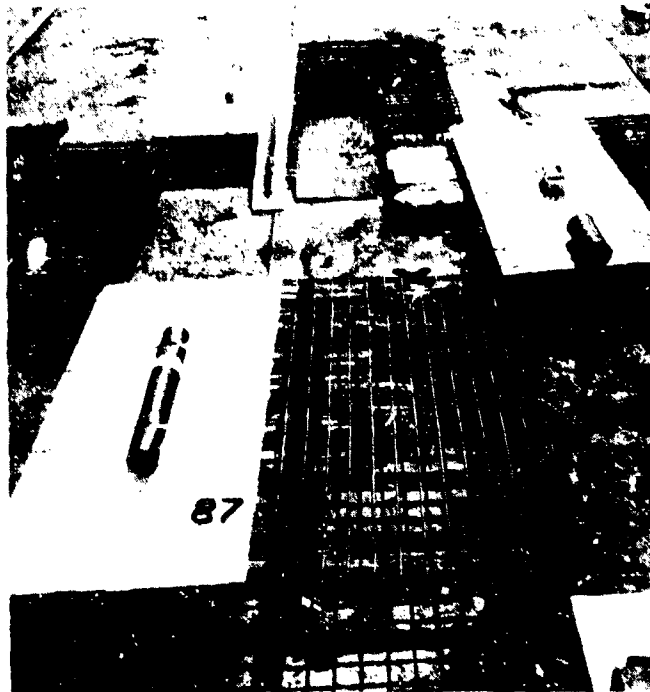


Fig. 371 - LST 52 - Method of securing Item 87.

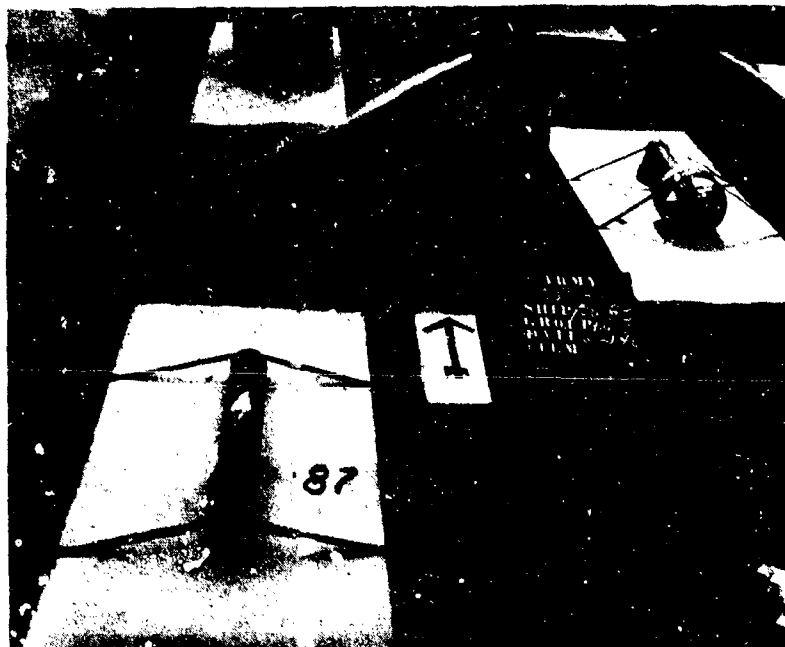


Fig. 372 - YOG 83 - Method of securing Item 87.

311
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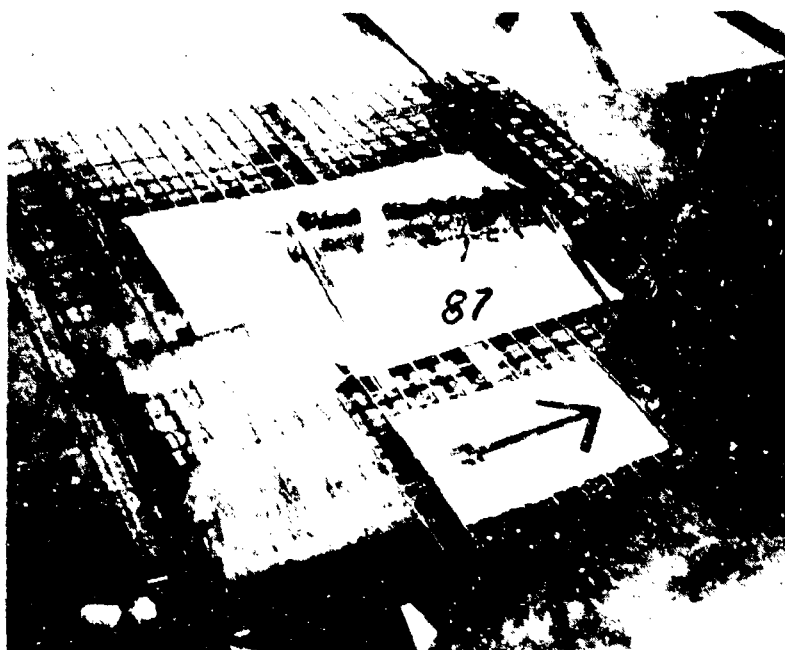


Fig. 373 - YOG 83 - Damage to Item 87 after Test Able.

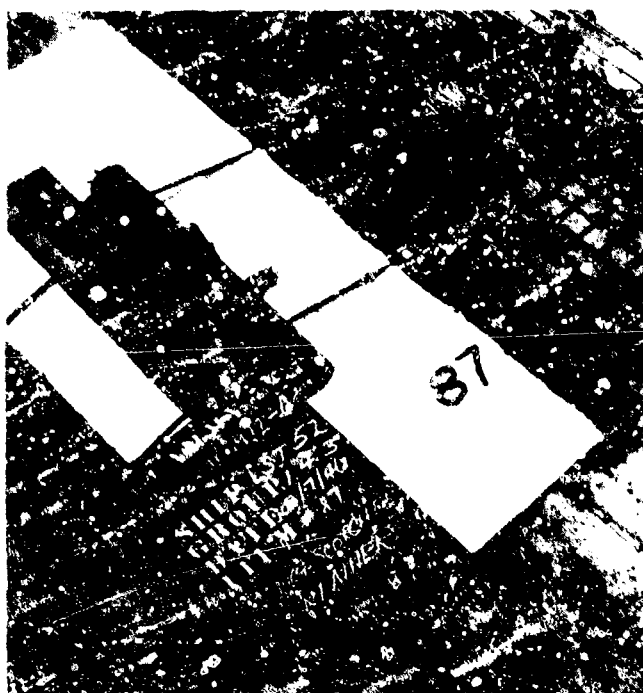


Fig. 374 - YST 53 - Damage to Item 87
after Test Able.

312
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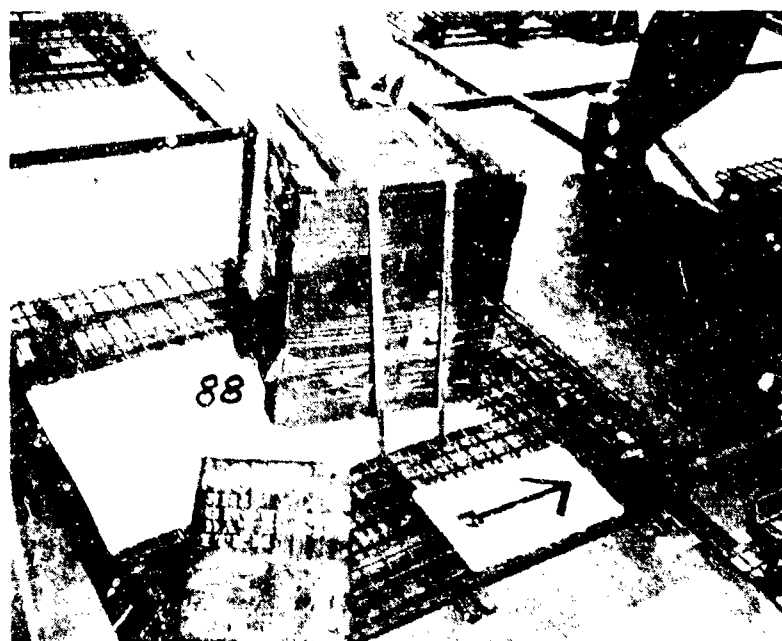


Fig. 375 - YOG 83 - Damage to Item 88 after Test Able.



Fig. 376 - LST 52 - Method of securing Items 89, 90, and 91.

313

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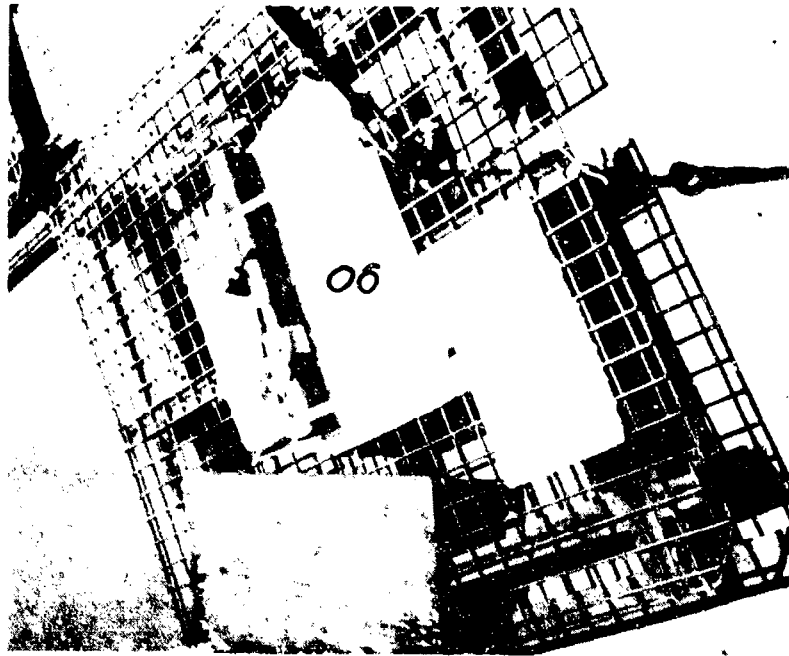


Fig. 378 - YOG 83 - Damage to Item 90 after Test Able.

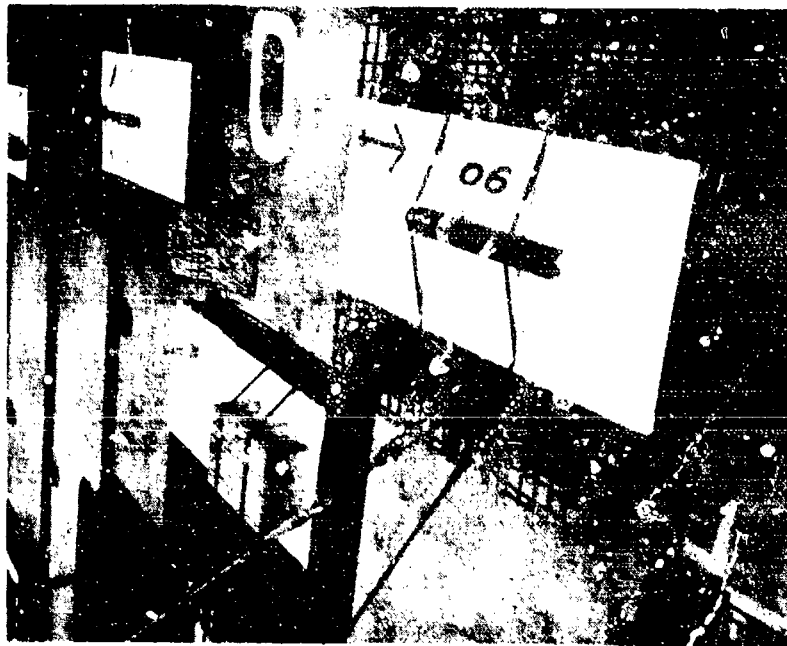


Fig. 377 - YOG 83 - Method of securing Item 90.

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j. Rocket, HE, AT, 2.36", M6A3F (Item #91). Six of these rockets were displayed in a wood box, Fig. 376. On the YOG 83, there was a slight scorching on one side, the end cleats, and top cleats of the box. The end cleats were also split. The unexposed sides had been splattered with asbestos matting. The box was moved 1" by the blast. On the LST 52, the item was masked partially by a Jacob's ladder and no damage resulted. On the LST 661, the box was slightly scorched but the markings were still legible. No damage was apparent on the remaining ships.

k. Rocket, Practice, 4.5", M17SS (Item #190). One round was displayed bare Fig. 379. On the YOG 83, the right front of the ogive was scorched. The right rear body was also scorched slightly. The tape holding the closing cap in place was parted. The closure cap was scorched and badly warped. On the LST 52, before Test Able, the closure cap was loose. After Test Able the tape on the shorting strap was scorched. No damage was apparent on the other ships.

l. Rocket, Practice, 4.5", M17SS (Item #191). One rocket was displayed in a metal container, Fig. 380. On the YOG 83, there was a slight scorching on the right side. The AIC code had been obliterated. Otherwise, the markings were legible. No damage was reported on the other ships.

6. PYROTECHNICS

a. Fusee, Red, M72 (Item #92). One fusee was displayed bare, see Fig. 381. There was no visible damage to the item masked by the wheel house on the YOG 83. On the LST 52, the item was partially masked and there was no damage. On the remaining ships no change was apparent.

b. Fusee, Red, M72 (Item #93). Thirty fusees were displayed in a box, see Fig. 382. There was no visible damage to the item masked by the wheel house on the YOG 83. On the LST 52, the cardboard box was scorched on one side. On the LST 661, the box was scorched on the side directly exposed to the blast effacing the markings. No apparent damage was noted on the remaining ships.

c. Signal Aircraft, AN-M53 (Item #94). One signal was displayed bare, see Fig. 383. On the YOG 83, see Fig. 271 and Fig. 384, the closing crimp opened from exposure. Slight scorching over an area of 1/2" x 2-1/2" on the side of the signal case obliterated some of

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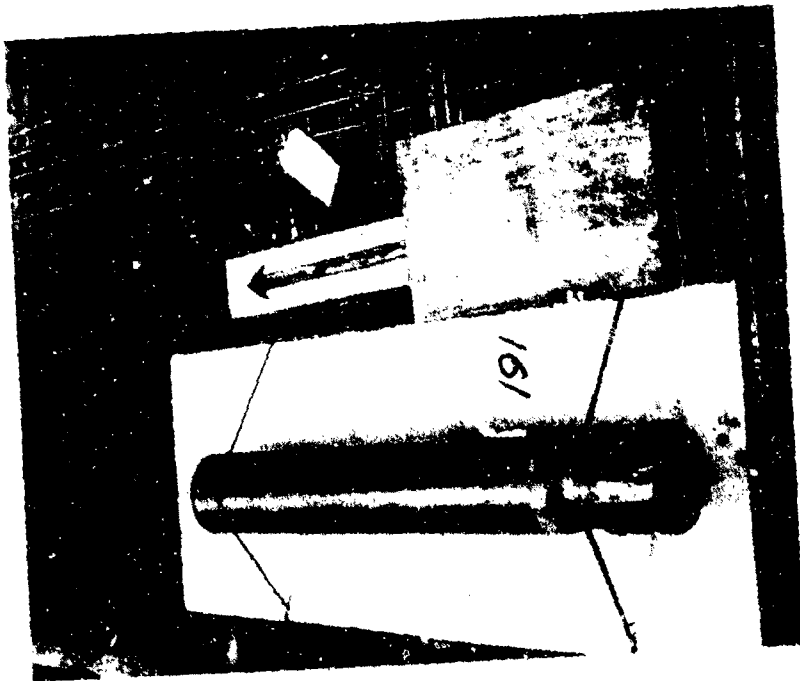


Fig. 380 - LST 661 - Method of securing
Item 191.

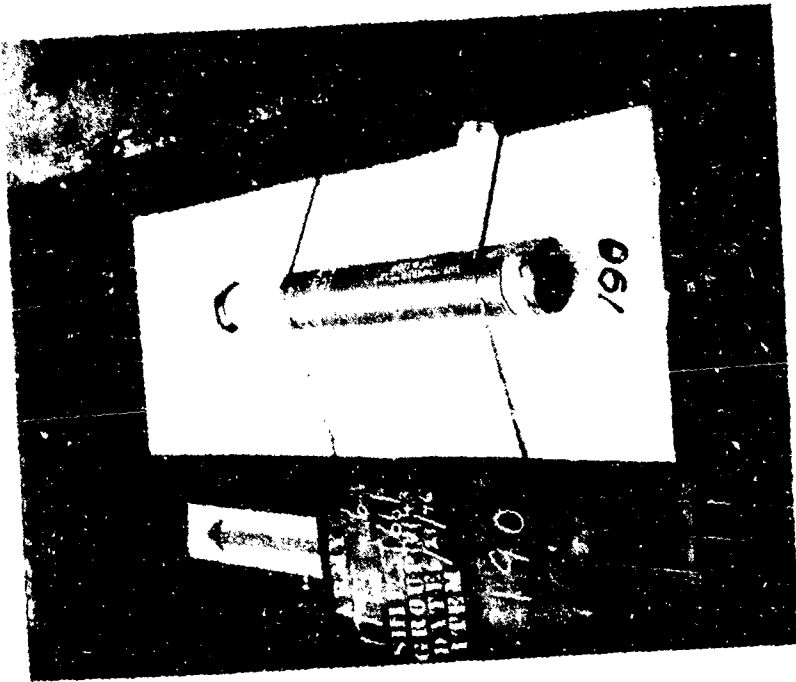


Fig. 379 - LST 661 - Method of securing
Item 190.

316
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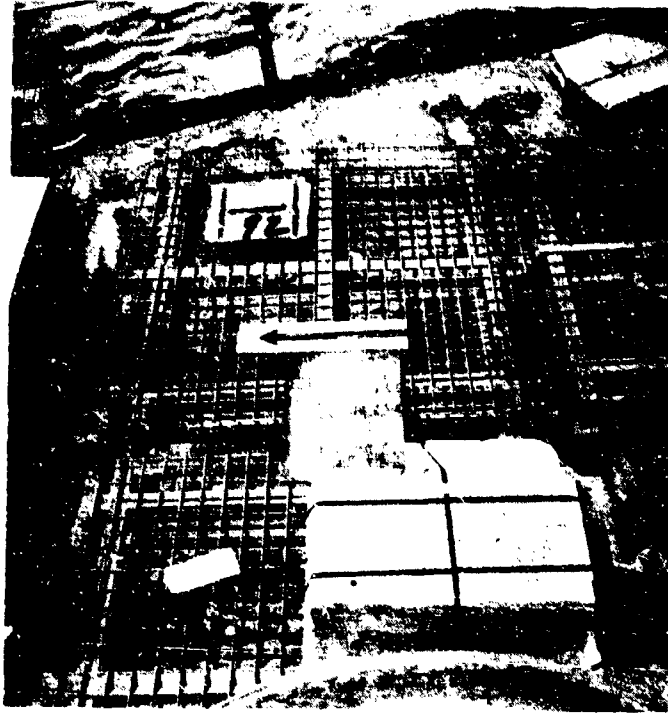


Fig. 381 - LST 661 - Method of securing Item 92.



Fig. 382 - YOG 83 - Method of securing Item 93.

317
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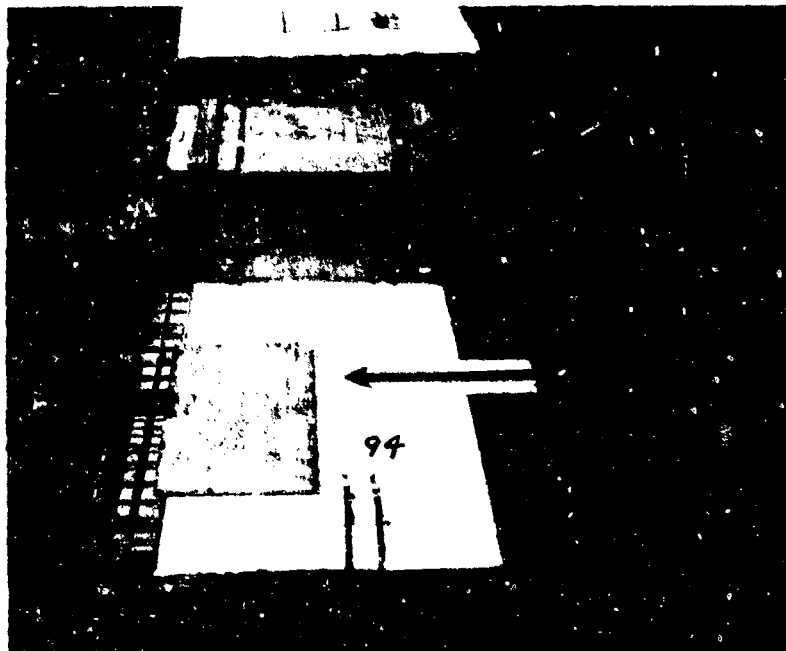


Fig. 383 - LST 83 - Method of securing Item 94.

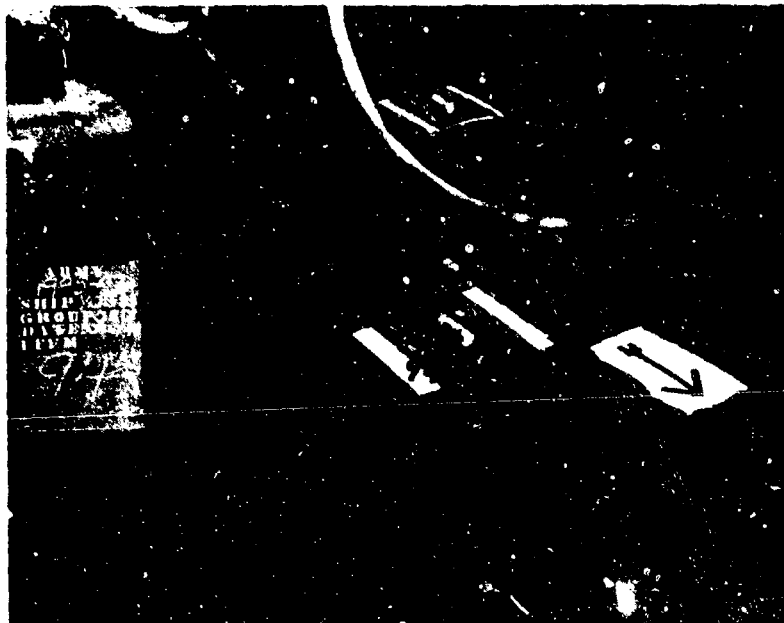


Fig. 384 - YOG 83 - Damage to Item 94 after Test Able.

318
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the nomenclature. On the LST 52, the signal case was scorched on the exposed side and dented by the strapping. No damage was apparent on the remaining ships.

d. Signal, Aircraft, AN-M53 (Item #95). One hundred thirty two signals were displayed in a box; see Fig. 385. On the YOG 83, see Fig. 276 and Fig. 386, the box was charred heavily by heat on the side, end, and part of the top. The markings were not legible. The wax was melted on the cardboard cartons inside the box. Heat from the combustion of the nearby 155mm propelling charges is believed to have caused this latter damage. On the LST 52, see Fig. 387, the box was charred; the charring was attributed to the burning of the 155mm propelling charges 4 feet away. The parts charred were those facing the blast on the top and sides. On the LST 661, the box was slightly scorched, but the markings were still legible. No damage was apparent on the remaining ships.

e. Signal, Ground, High Burst, Ranging, M27 (Item #96). One was displayed bare, see Fig. 388. On the YOG 83, the nomenclature was obliterated by exposure to rain. No primary damage was sustained, as the item was shielded by the boat deck. No damage resulted on any of the other ships.

f. Signal, Ground, High Burst, Ranging, M27 (Item #97). Ninety-eight were displayed in a wood box, see Fig. 388. On the YOG 83, see Fig. 271 and Fig. 383, the box was charred by the heat from the combustion of the 155mm propelling charges. The forward two thirds of the side ranges from slight scorching to charring. The rest of the box was unchanged but it was moved 1/3" from its original position. On the LST 52, the box was charred and scorched on the side and top. This charring was attributed to the burning of the 155mm propelling charges 6 feet away. No other damage was sustained. On the LST 661, the box was slightly scorched but the markings were still legible. On the remaining LSTs there was no damage apparent.

g. Flare, Ground, F9 (Red) (Item #99). Thirty were displayed in a wood box, see Fig. 389. On the LST 52, the box was scorched on the side next to the blast. On the LST 661, the box was slightly scorched but the markings were still legible. On the YOG 83, the item was not damaged since it was masked by the wheel house. No damage to the other ships was apparent.

h. Flare, Airport, T15 (Item #100). One flare was displayed bare, see Fig. 390. On the LST 52, the flare

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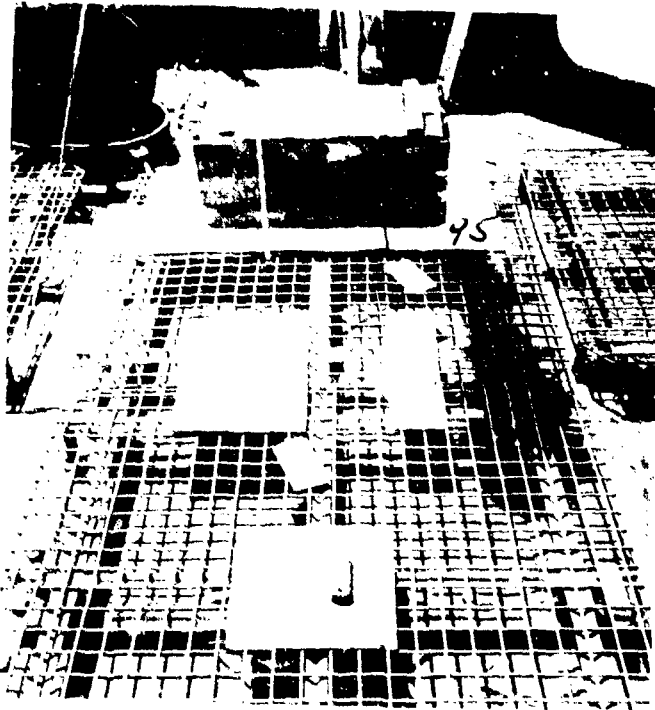


Fig. 385 - LST 661 - Method of securing
Item 95.

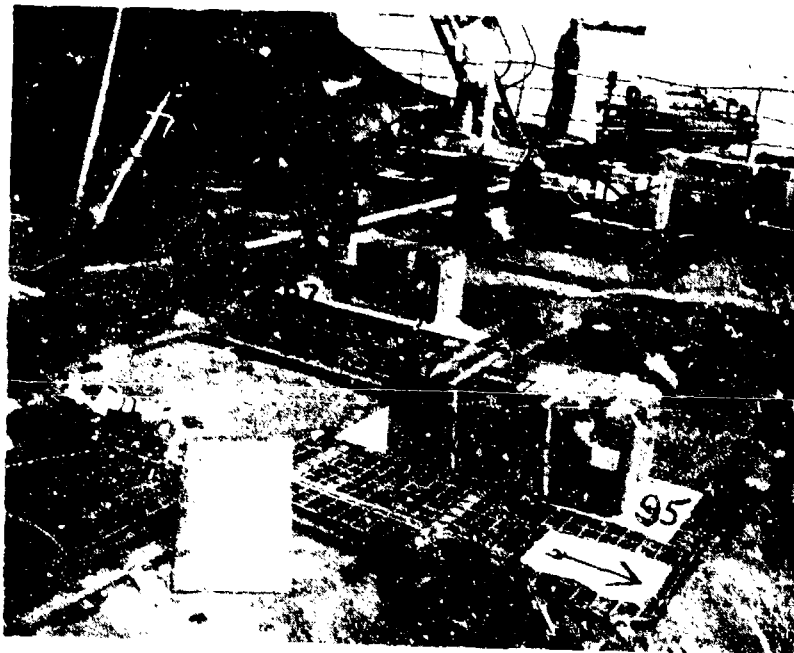


Fig. 386 - YOG 83 - Damage to Items 95 and 97
after Test Able.

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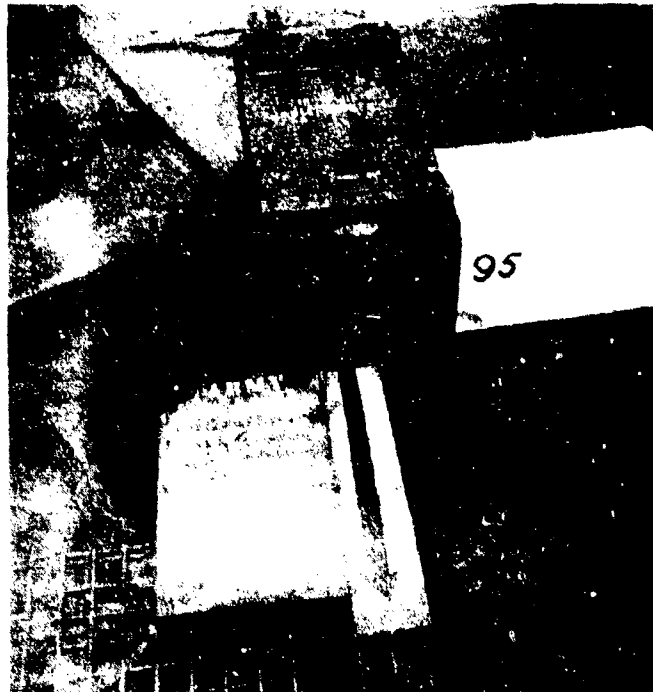


Fig. 387 - LST 52 - Damage to Item 95
after Test Able.

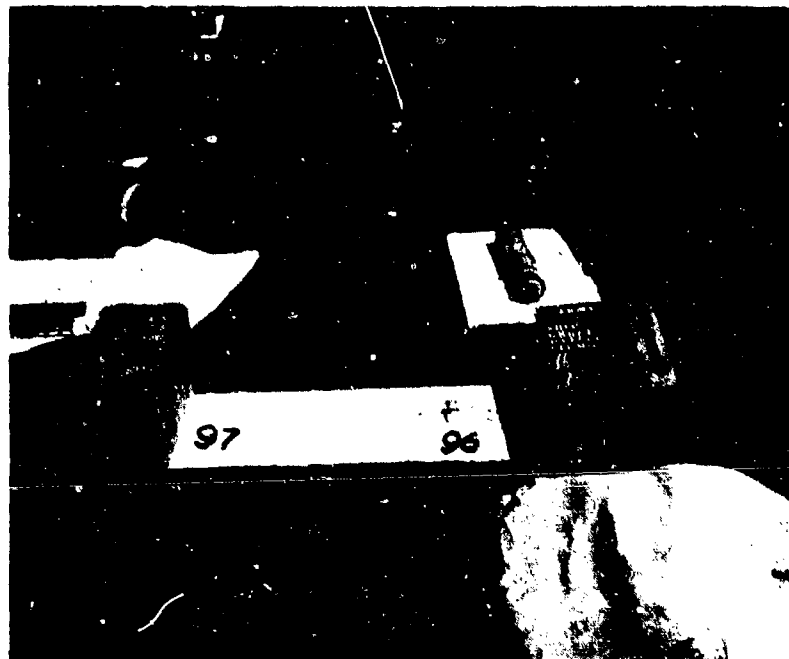


Fig. 388 - LST 52 - Method of securing Items
96 and 97.

321
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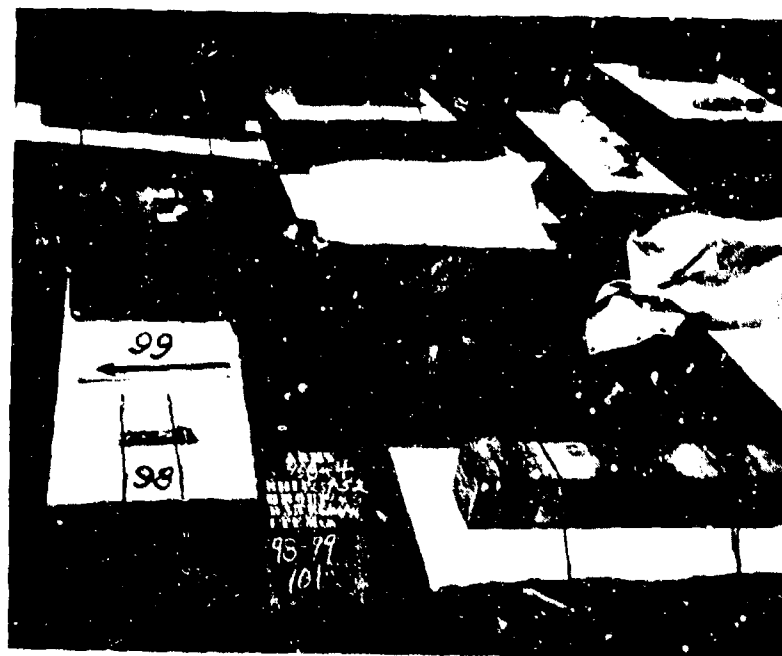


Fig. 389 - LST 52 - Method of securing Items 98 and 99.

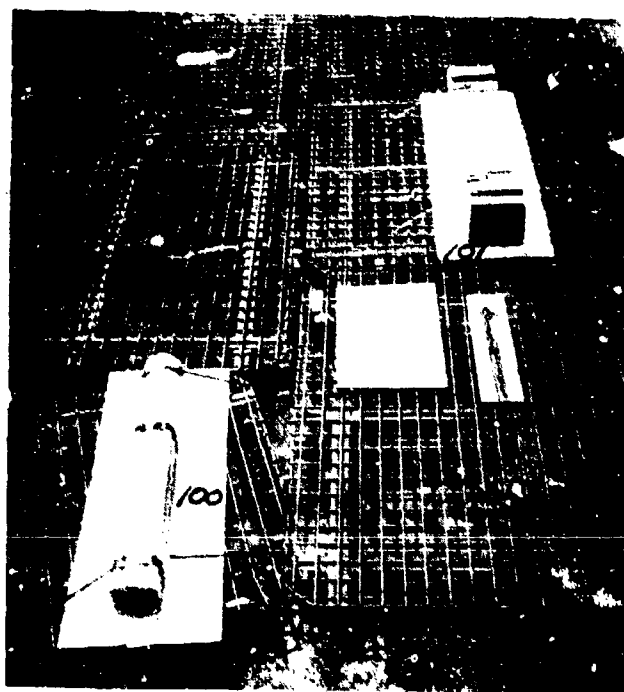


Fig. 390 - LST 661 - Method of securing Items 100 and 101.

322
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body was slightly scorched on the blast side and the legs were parted from the flare body. On the YOG 83, the item was masked and suffered no damage. There was no apparent damage to the other ships.

1. Flare, Aircraft, T15 (Item #101). One was displayed in a wood box, see Fig. 390. On the LST 52, the box was scorched on the exposed side but was still serviceable. On the YOG 83, the item was masked. No apparent damage to this item occurred on the other ships.

k. Flare, Aircraft, Parachute, M26 (Item #102). One flare was displayed bare, see Fig. 391. On the YOG 83, the item was masked. On the LST 52, the nose was slightly scorched. There was no damage apparent on the other four ships.

1. Flare, Aircraft, Parachute, M26 (Item #103). One flare was displayed in a wood box, see Fig. 392. On the YOG 83, the item was masked. On the LST 52, the box was scorched on the exposed side. There was no damage apparent on the remaining ships.

2. Flare, Trip, Parachute, M48 (Item #104). One was displayed bare, see Fig. 393. On the YOG 83, the item was masked. On the LST 661, the item was partially masked by a winch. No damage was apparent on any of the ships.

2. Flare, Trip, Parachute, M48 (Item #105). Three flares were displayed in a wood box, see Fig. 395. On the LST 52, the box was slightly scorched on the exposed side. On the YOG 83, the box was masked by the bomb deck. No damage to the flares was apparent on this or the remaining ships.

2. Flare, Trip, M49 (Item #106). One flare was displayed bare, see Fig. 394. On the LST 52, the flare body was slightly scorched on the exposed side and the trip wire broken. On the YOG 83, the item was masked. There was no apparent damage on this or the remaining three ships.

2. Flare, Trip, M49 (Item #107). Fifteen flares were displayed in a wood box, see Fig. 395. On the LST 52, the box was slightly scorched on the side towards the bomb. No damage, on the YOG 83, was noted because of masking of the item by the bomb deck. There was no apparent damage to the item on the other ships.

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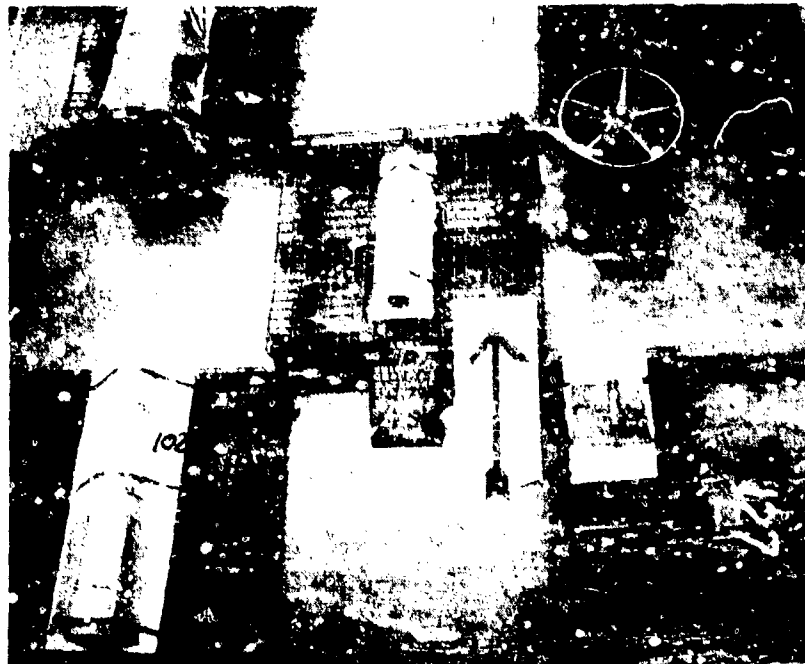


Fig. 391 - YOG 83 - Method of securing Item 102.

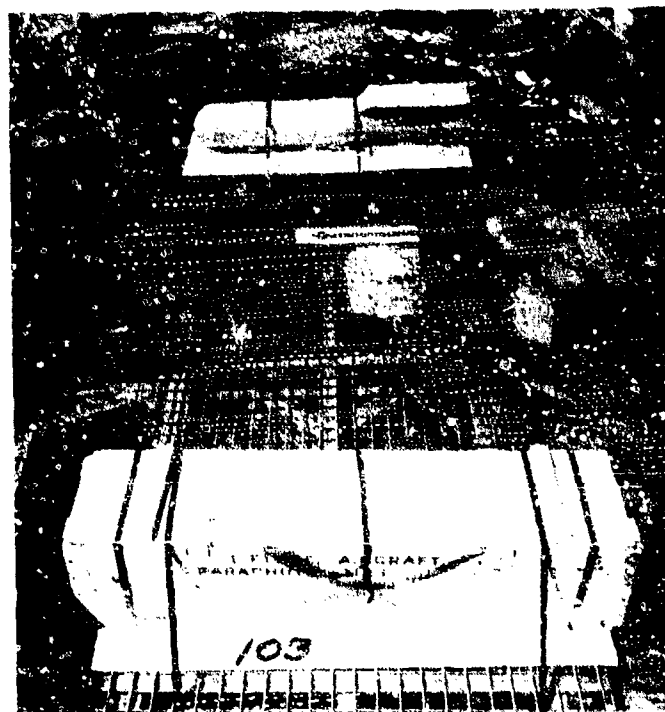


Fig. 392 - LSF 681 - Method of securing Item 103.

324
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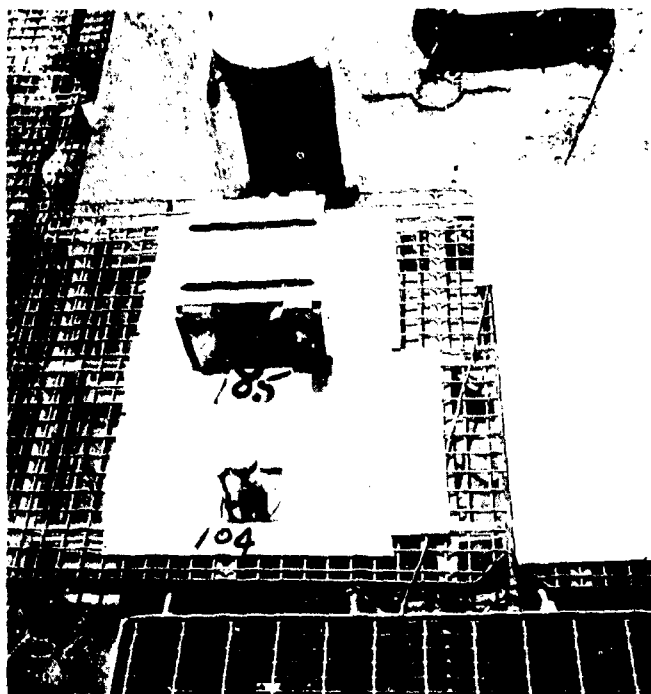


Fig. 393 - LST 651 - Method of securing
Items 104 and 105.



Fig. 394 - YOG 83 - Method of securing Item 106.

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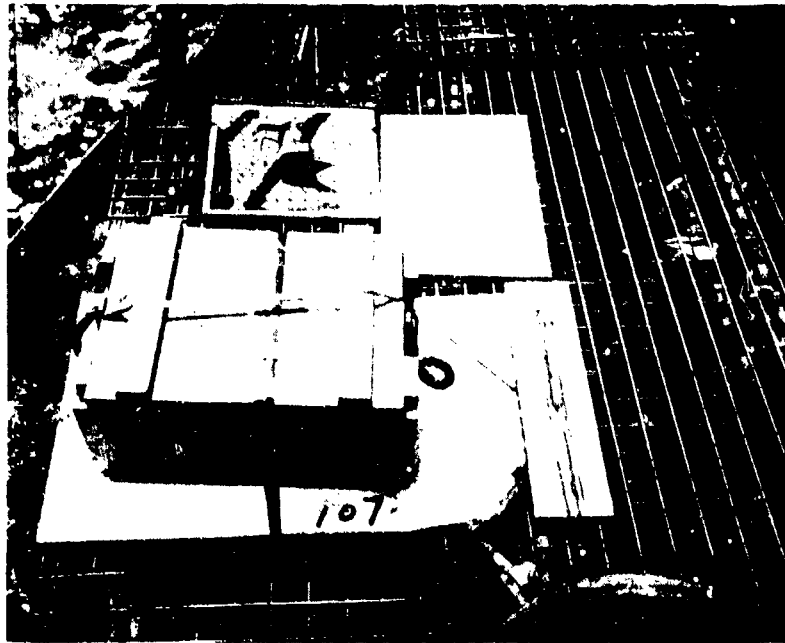


Fig. 395 - LST 661 - Method of displaying Item 107.

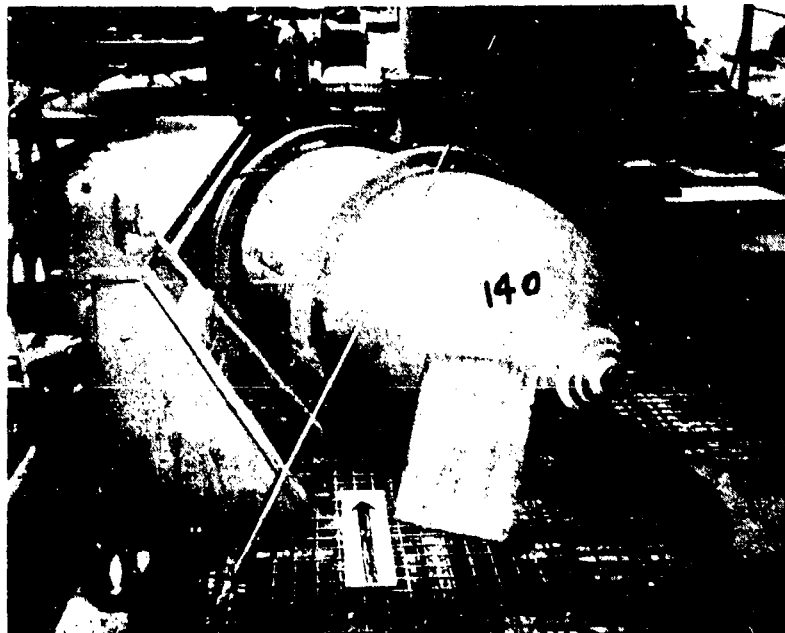


Fig. 396 - LST 52 - Method of securing Item 140.

326
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7. Bombs

a. Bomb, Demolition, 4000 lb., AN-M56A1 (Item #140). One was displayed with the shipping bands in place, see Fig. 396 and Fig. 397. None was displayed on the YOG 83. The bombs on the four other ships were not damaged.

b. Bomb, Target Identification, 250 lb., M89 (Item #141). One bomb was displayed bare, see Fig. 398. On the YOG 83, there was rust in the fuse threads and cavity. No primary damage was sustained by this item as it was masked by the boat deck. No damage was apparent on the remaining ships.

c. Bomb, Photoflash, 100 lb., AN-M46 (Item #142). One bomb was displayed bare, see Fig. 399. On the YOG 83, see Fig. 400 and Fig. 401, the bomb was lightly coated with rust. There was a slight scorch at the base of the bomb body. The stencilled markings were in excellent condition. Asbestos was spattered on the side of the body. On the LST 52, the item was partially masked by an overhead life raft support but was scorched on the nose. There was no damage apparent on the remaining three ships.

d. Bomb, Photoflash, 50 lb., T6E2 (Item #195). One was displayed bare, see Fig. 402 and Fig. 403. There was no apparent damage to this item on any of the five target ships on which it was displayed.

8. Grenades.

a. Grenade, Hand, O/D, T32, w/Fuze T1005 (Item #143). One grenade was displayed bare, see Fig. 404. There was no apparent damage to this item on any of the ships.

b. Grenade, Hand, O/D, T32, w/Fuze T1005 (Item #144). Five grenades were displayed in a wood box, see Fig. 405. On the LST 52, the box was ~~stepped~~ on the exposed side. On the LST 661, the box was slightly scorched, but the nomenclature markings were still legible. There was no damage apparent on the remaining three ships.

c. Grenade, Hand, Offensive, Mk3A1 (Item #145). One grenade was displayed bare, see Fig. 406. On the YOG 83, see Fig. 407 and Fig. 408, there was a slight scorch on the exposed end. Asbestos matting was spattered on both ends but the markings were legible. On the LST 52, the item was dented by straps. There was no apparent damage on the remaining ships.

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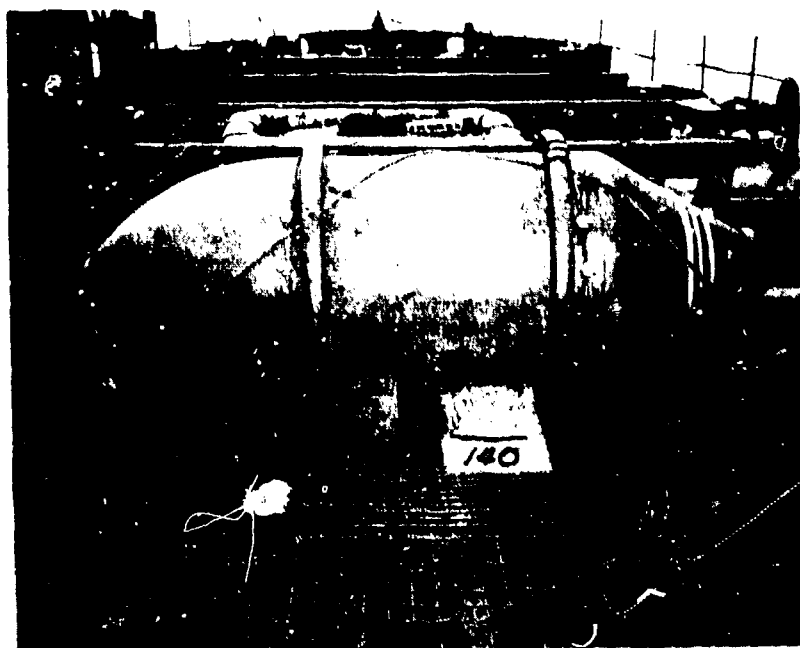


Fig. 397 - LST 545 - Method of securing Item 140.

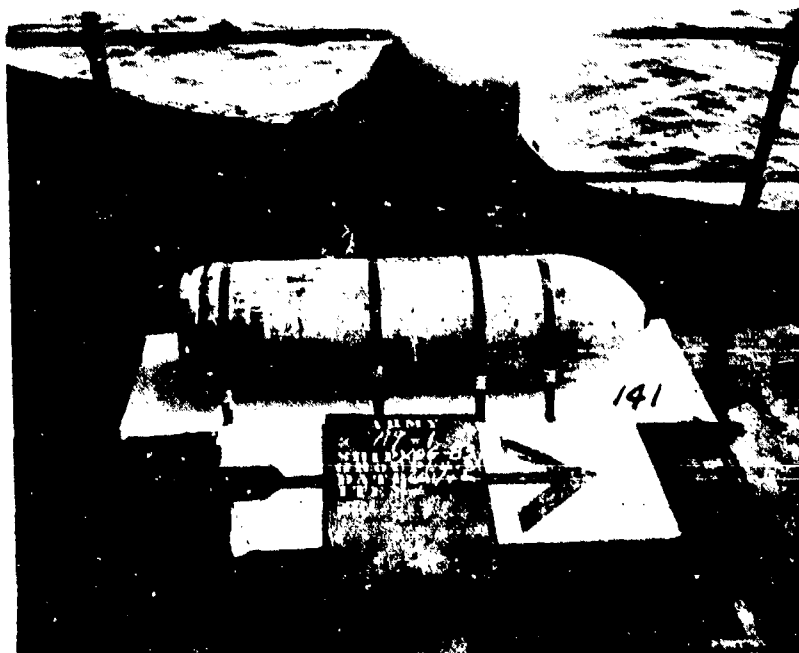


Fig. 398 - YOG 83 - Method of securing Item 141.

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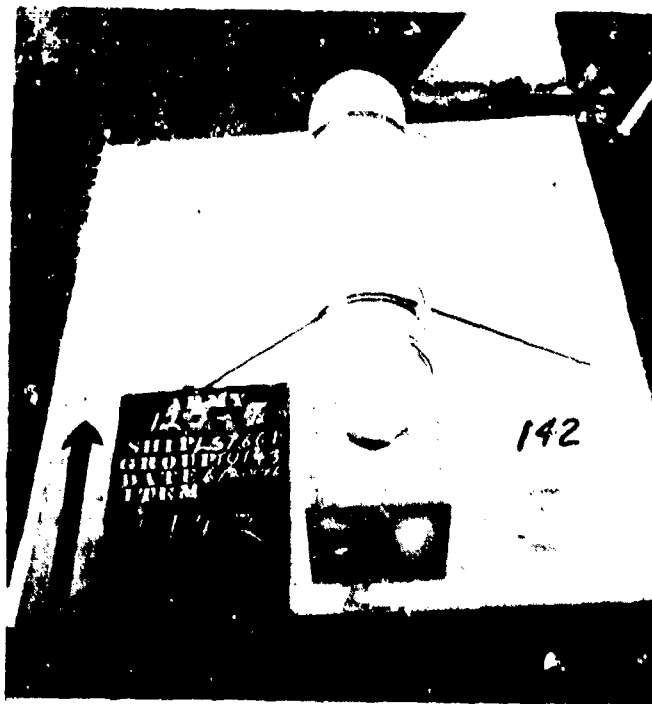


Fig. 399 - LST 661 - Method of securing Item 142.

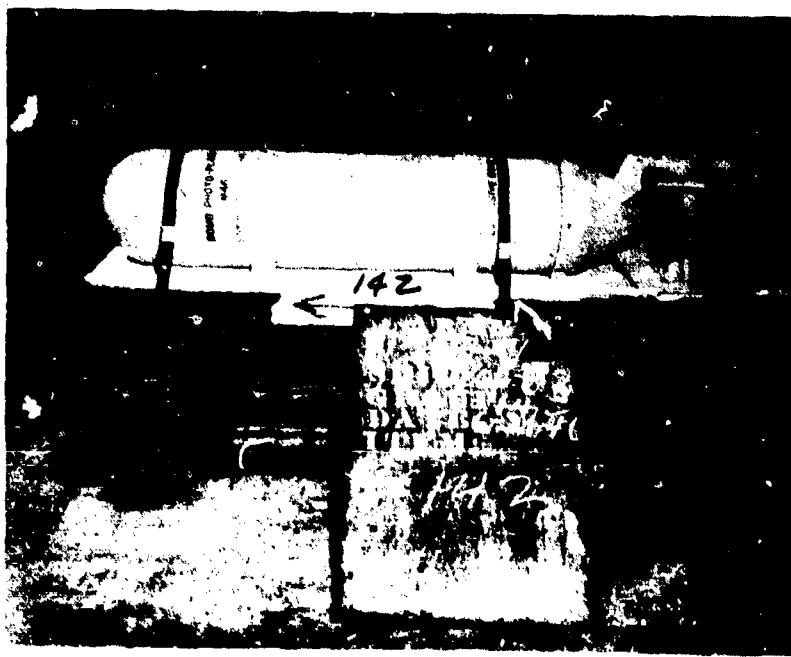


Fig. 400 - YOG 83 - Method of displaying Item 142.

329
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Fig. 401 - YOG 83 - Damage to Item 142 after Test Able.



Fig. 402 - YOG 83 - Method of securing Item 195.

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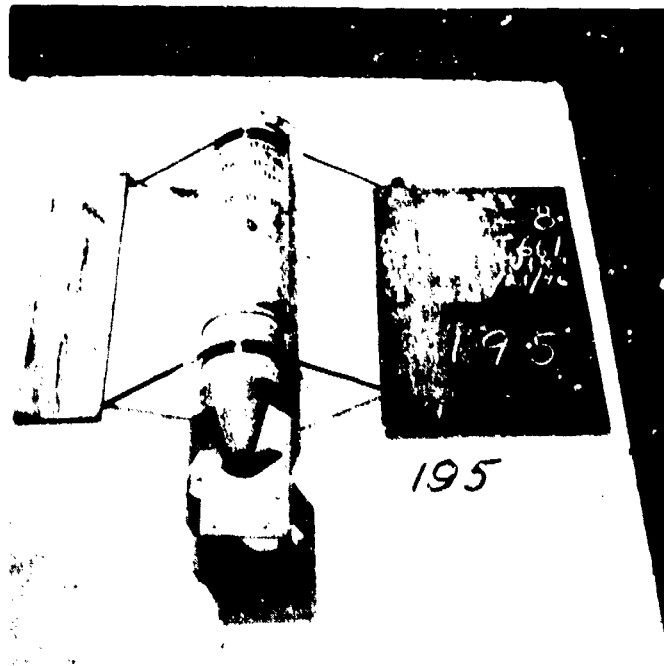


Fig. 403 - LST 661 - Method of securing Item 195.

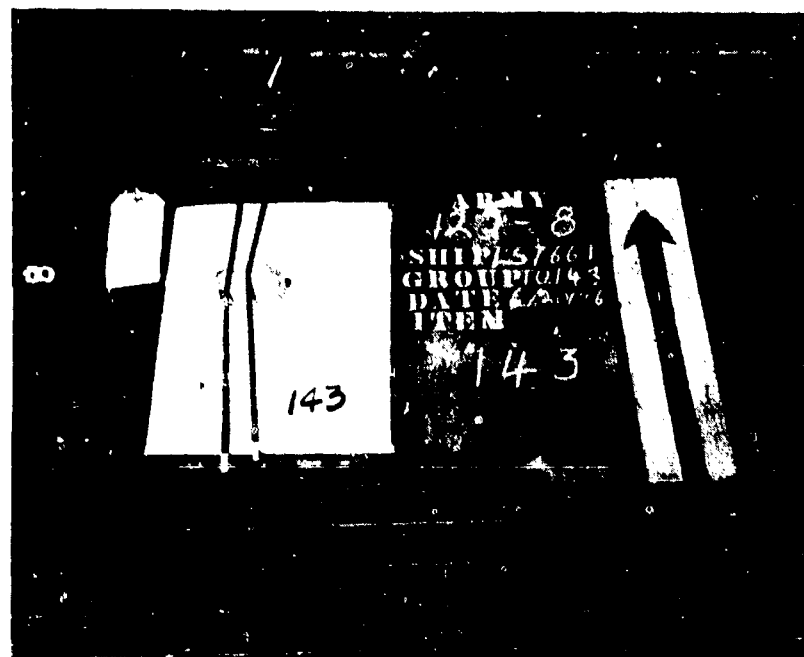


Fig. 404 - LST 661 - Method of securing Item 143.

331
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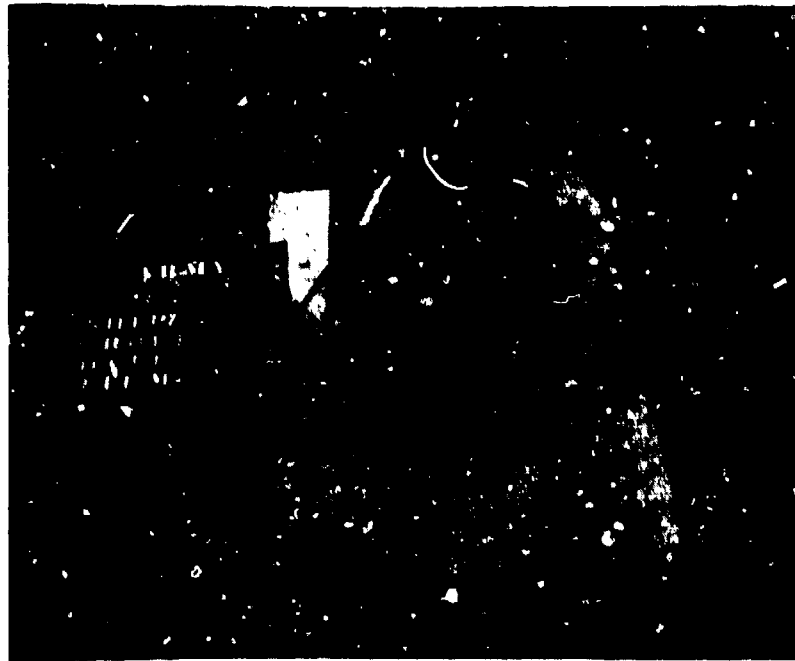


Fig. 405 - LST 661 - Method of securing Item 144.



Fig. 406 - LST 661 - Method of securing Items 145 and 146.

332
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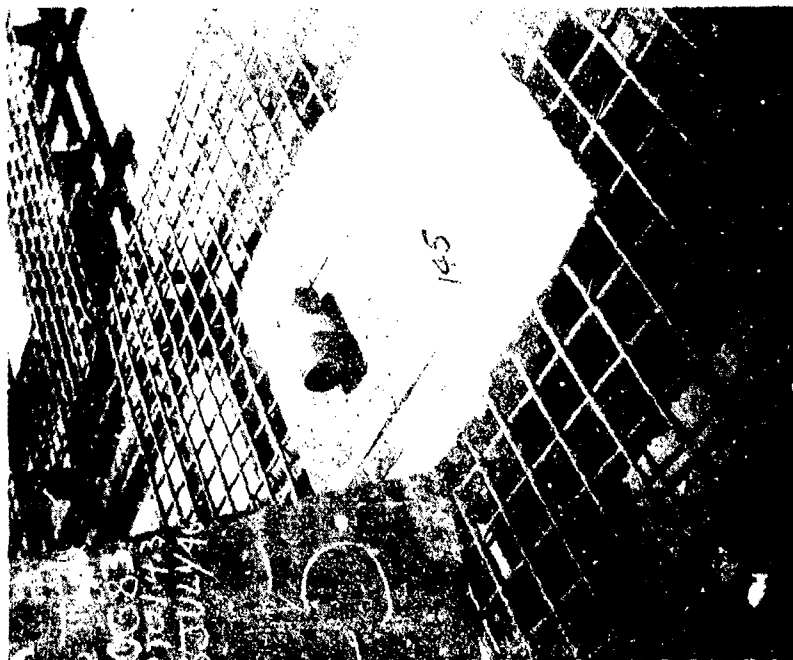


Fig. 408 - YOG 83 - Damage to Item 145
after Test Able.



Fig. 407 - YOG 83 - Method of displaying
Items 145 and 146.

333
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d. Grenade, Hand, Offensive, Mk3A1 (Item #146). Forty-nine were displayed in a wooden box, see Fig. 406. On the YOG 83, see Fig. 407 and Fig. 409, the box was slightly charred on the top, diagonally for a distance of 2-1/2" from the back and end. The box was moved ahead and to the side 1/8". On the LST 52, the box was slightly scorched on the exposed side and top. On the LST 661, the box was slightly scorched, but the markings were still legible. There was no apparent damage on the other ships.

9. Mines.

a. Fuze, Mine, AB Horn, T-25 (Item #147). Six were displayed bare, see Fig. 410. On the YOG 83, the paper instructions were partially burned off the fuze. On the LST 52, the fuze was dented by straps, and the bases on all six were scorched on the sides facing the blast. There was no damage apparent on the remaining three ships.

b. Mine, AT, HE, T7, light, w/o Fuze (Item #148). One was displayed bare, see Fig. 411. On the YOG 83, the pressure plate hinges were rusted at the ends. No other damage was incurred. The mine was masked by Item #145 on the LST 52. There was no damage apparent on the remaining three ships.

c. Mine, AT, HE, T7, light, w/o Fuze (Item #149). Seven mines were displayed in a metal box, see Fig. 412. On the YOG 83, the exposed side of the box was slightly scorched. There was a slight spattering of asbestos on the other side of the box. On the LST 52, the part of the pull-up strap which was sticking out from under the lid was scorched. There was no damage apparent on the remaining three ships.

d. Mine, AT, HE, M6 (heavy) w/Fuze (Item #150). One was displayed bare, see Fig. 413. On the YOG 83, see Fig. 414 and Fig. 415, the fuze can and activator can were slightly scorched on the rear and right side. The mine body was not scorched, but the sealing tape on the activator well was scorched and torn. Evidently some foreign object had been blown across the mine and left scratches on it. On the LST 52, the item was partially masked by the elevator ramp. No primary damage was apparent on this or the remaining ships.

e. Mine, AT, HE, M6 (heavy) w/Fuze (Item #151). One mine was displayed in a crate, see Fig. 416 and Fig. 417. On the YOG 83, the mine and crate were scorched slightly on the exposed side. The sealing tape on the

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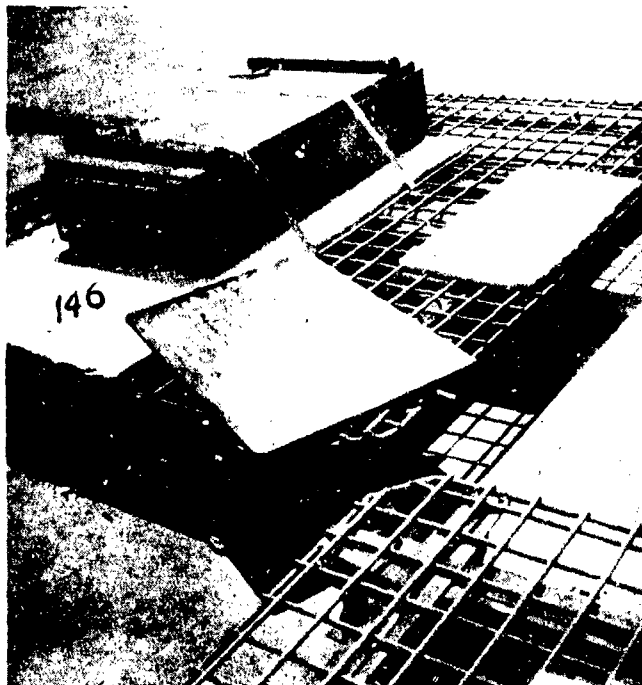


Fig. 409 - YOG 83 - Damage to Item 146
after Test Able.

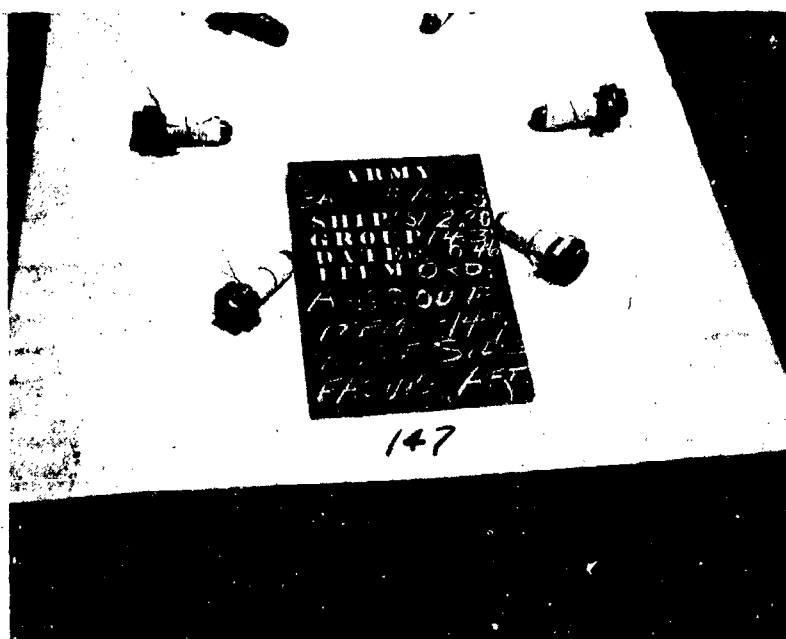


Fig. 410 - LST 220 - Method of securing Item 147.

335
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Fig. 411 - LST 661 - Method of securing Item 148.

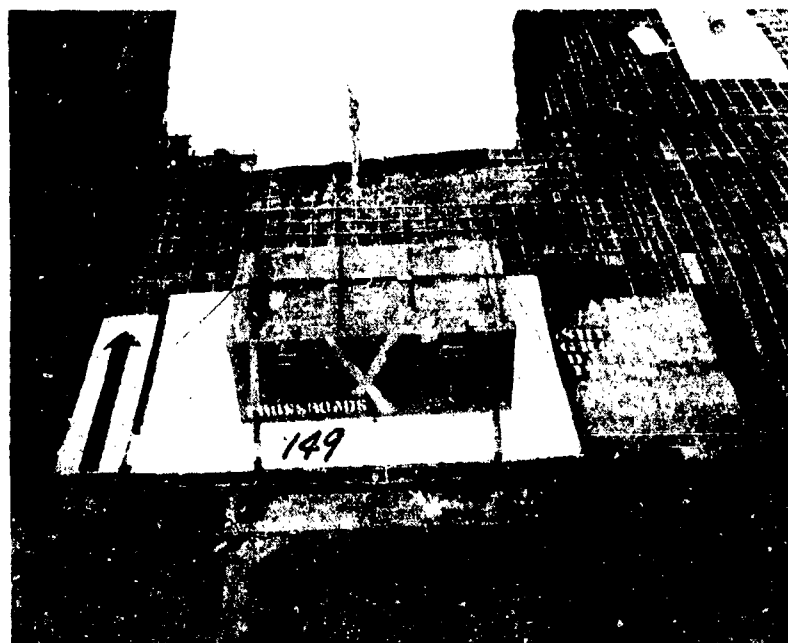


Fig. 412 - LST 661 - Method of displaying Item 149.

336
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Fig. 413 - LST 661 - Method of displaying Item 150.



Fig. 414 - YOG 83 - Method of displaying Items 150, 152, and 154.

337
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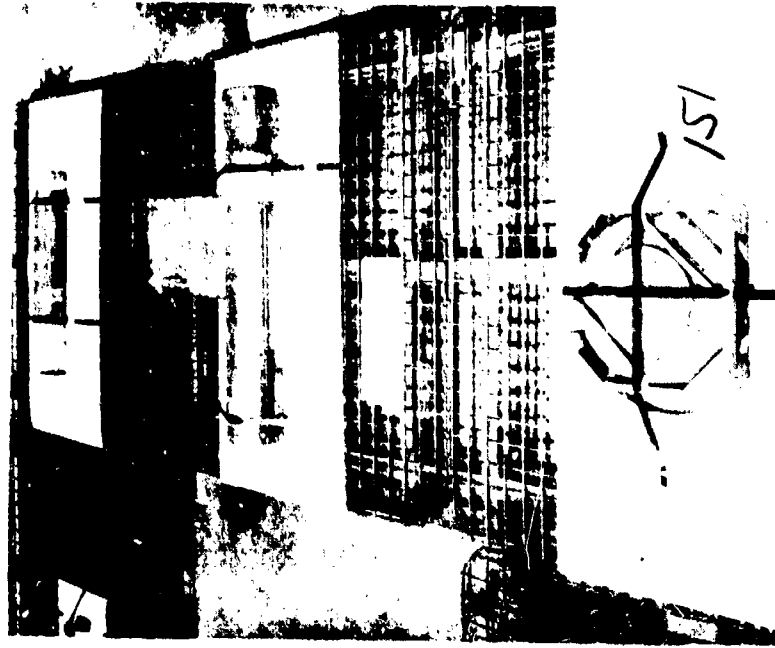


Fig. 416 - YOG 83 - Method of displaying
Item 151.

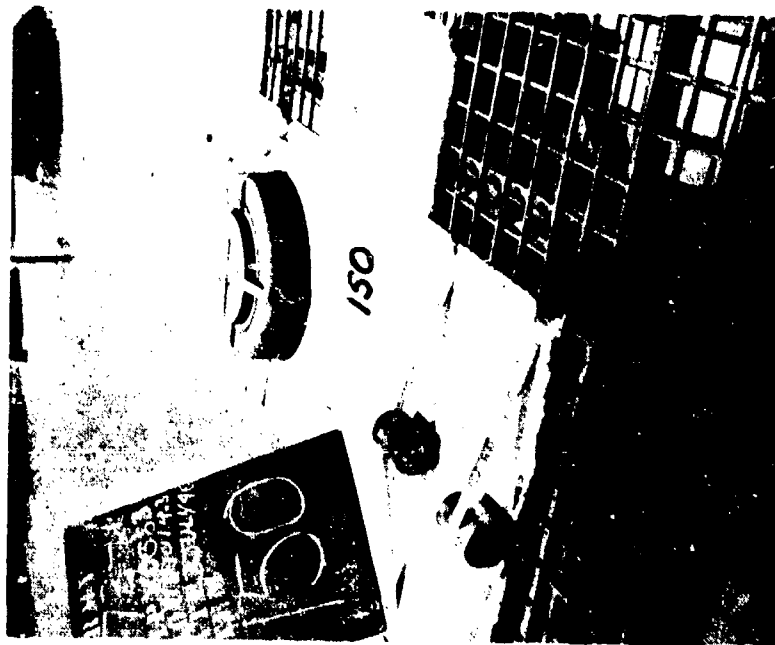


Fig. 415 - YOG 83 - Damage to Item 150
after Test Able.

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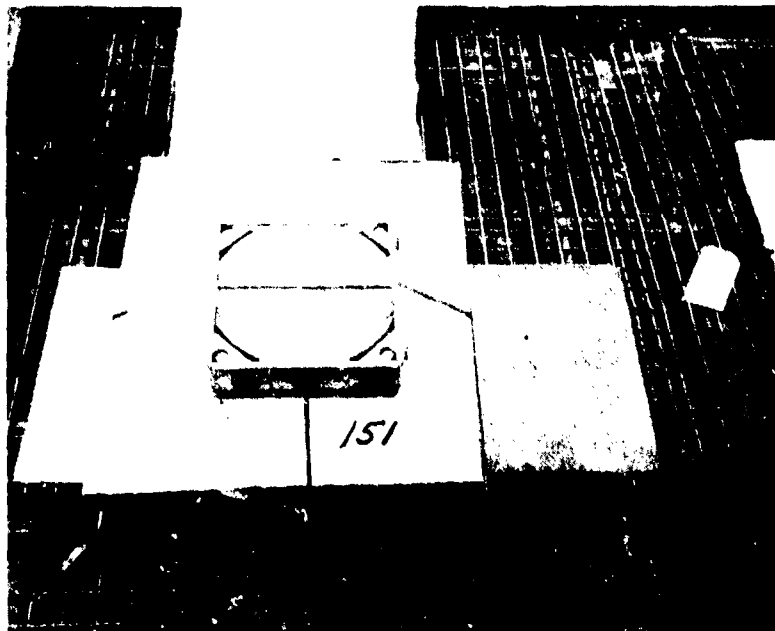


Fig. 417 - LST 661 - Method of securing Item 151.

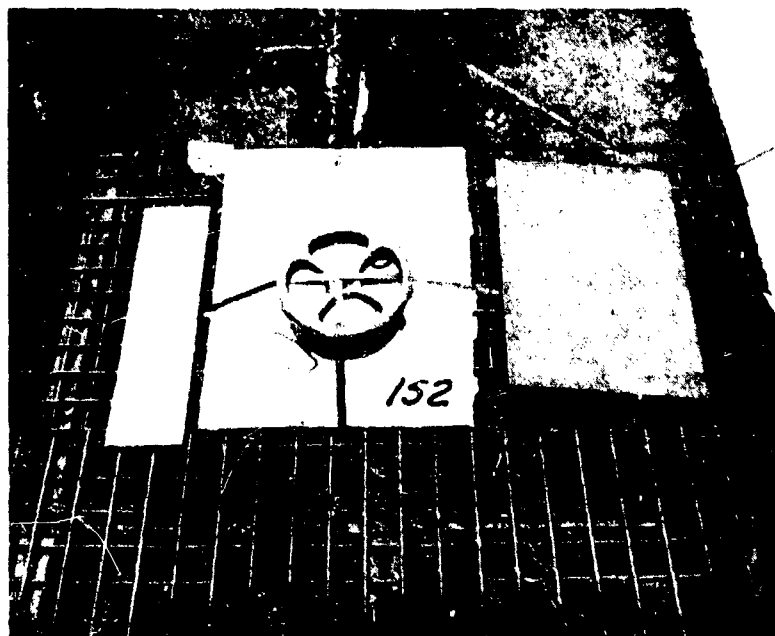


Fig. 418 - LST 661 - Method of securing Item 152.

339
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activator well was scorched and ripped. The crate and mine were rusted on the top. On the LST 52, the item was masked by an elevator and ramp. No damage was apparent on the other ships.

f. Mine, AT, HE, M4, w/o Fuse (Item #152). One mine was displayed bare, see Fig. 418. On the YOG 83, see Fig. 414 and Fig. 419, the mine was slightly scorched around the activator well. The handle was rusty. The spider was found 7 feet away toward the source of the blast. The spider center had been driven downward 1/2" and the hooks bent outward about 1/2". On the LST 52, the fuse well was untaped before Test Able. The mine was masked completely. No damage was apparent on the other ships.

g. Mine, AT, HE, M4, w/o Fuse (Item #153). Four mines were displayed in a wood box, see Fig. 420. On the YOG 83, see Fig. 421, one end and the back were excessively charred. The stencilling on the side and rear was charred. The bottom of the box was splintered and the side of the box had pulled away about 3/16" at one end. Masking marks made by the strapping were clearly visible. On the LST 52, the box was scorched on the exposed side. On the LST 661, the box was lightly scorched. No damage was apparent on the other ships.

10. Demolition

a. Charge, Shaped, 15 lb., M2A3 (Item #154). One was displayed bare, see Fig. 422. On the YOG 83, see Fig. 414 and 423, the inside wall of the stand-off, on the side nearest the blast, was scorched from the outer edge inward about 3". On the side away from the blast, the inside walls were charred. Fifty percent of the outside walls were charred. Fifty percent of the outside walls of the body of the charge were charred. The stand-off and ogive were charred in the upper quadrant on the side nearest the blast. Mask marks made by a loop of the carrying strap as well as the metal tie-down straps were clearly visible on the body of the charge. No markings remained on the charge on the LST 52, see Fig. 424. The charge was dented by the tie-down straps for approximately 180°. The body of the charge was scorched on the side exposed to the blast. On the LST 661, the charge was slightly scorched on the side nearest the blast. It had been partially masked by a winch. No damage was apparent on the LST 220 and LST 545.

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Fig. 419 - YOG 83 - Damage to Item 152
after Test Able.

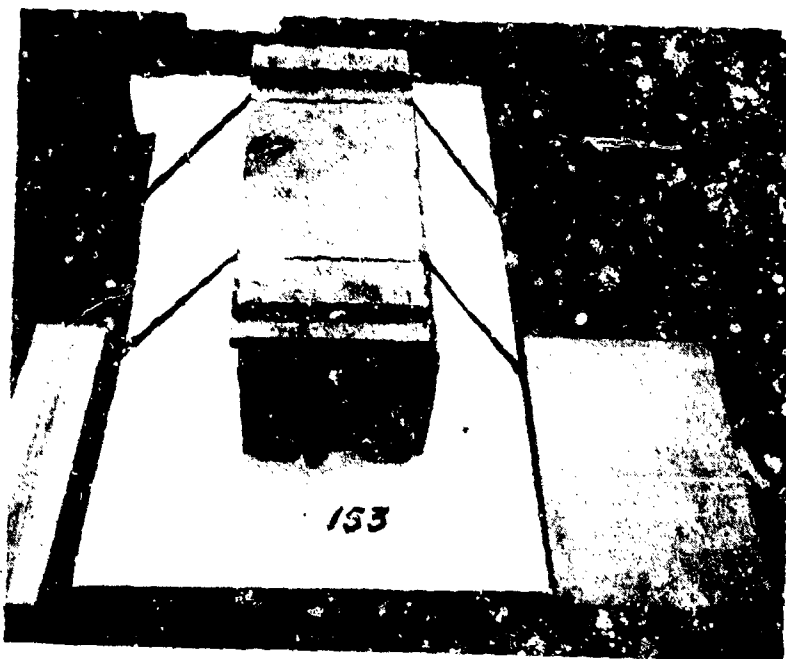


Fig. 420 - LST 661 - Method of securing Item 153.

341
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Fig. 421 - YOG 83 - Damage to Items
153 and 160 after Test Able.



Fig. 422 - LST 661 - Method of securing Item 154.

342
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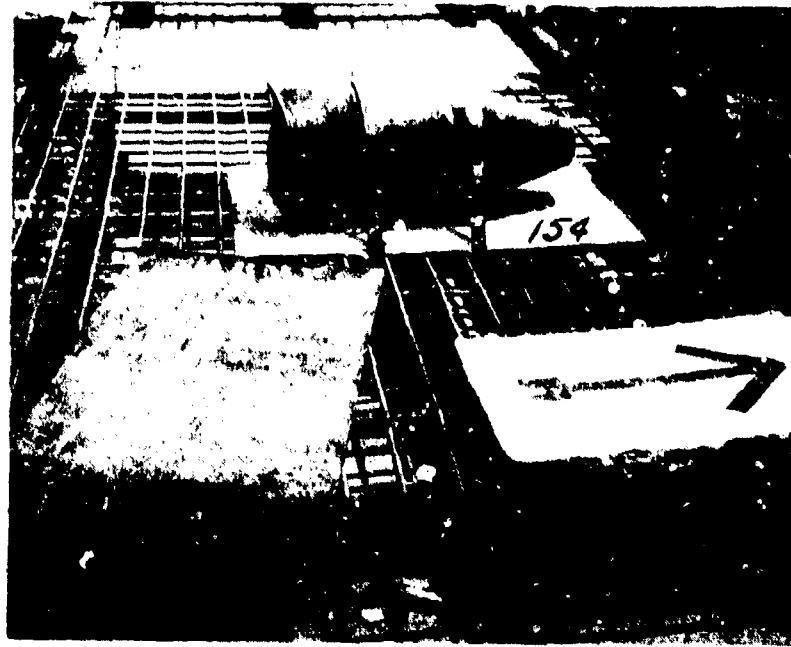


Fig. 423 - YOG 83 - Damage to Item 154 after Test Able.



Fig. 424 - LST 52 - Damage to Item 154 after Test Able.

343
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b. Torpedo, Bangalore, M1A1 (Item #155). One was displayed bare, see Fig. 425. On the YOG 83, four rust spots approximately 1" long were found on the top of the torpedo. The cause of the paint removal and resultant rusting was not apparent. No other damage was sustained as this item was shielded by the pumphouse. On the LST 52, the torpedo was scorched on the exposed end and there was rust in the fuse wells. On the remaining ships there was no apparent damage.

c. Torpedo, Bangalore, M1A1 (Item #156). One torpedo was displayed in a box, see Fig. 425. On the YOG 83, no damage was done to this item as the pumphouse shielded it. Asbestos was spattered on the box but the torpedo inside was in excellent condition. On the LST 52, the box was scorched on the exposed side. No damage was apparent on the LSTs 220, 545, and 661.

d. Cartridge, Snake, Demolition, M3 (Item #157). One was displayed bare, see Fig. 426. On the LST 52, see Fig. 427 and Fig. 428, the cartridge was blown from the pallet onto the port side of the deck. There was no damage incurred other than superficial dents in the casing. No damage was apparent on the other ships.

e. Cartridge, Snake, Demolition, M3 (Item #158). One was displayed in a box, see Fig. 426. On the LST 52, see Fig. 427 and Fig. 429, the cartridge was displayed on the ship's elevator which was disturbed by the blast and left suspended between the tank and weather decks. The damage to the cartridge consisted of dents in the casing. It was blown from its box and landed on an elevator ramp. There was no apparent damage on the remaining ships.

f. Block, Demolition, TNT, 1/2 lb. (Item #159). Four blocks were displayed bare, see Fig. 430. On the YOG 83, see Fig. 431 and Fig. 432, the paper covering was slightly charred and ripped by the blast. There was no apparent damage to the TNT itself. On the LST 52, the item was scorched on the exposed side. The outside skin of paper on one block was burned off on the side facing the blast. No damage was apparent on the other target ships.

g. Block, Demolition, TNT, 1/2 lb. (Item #160). Four blocks were displayed in a wood box, see Fig. 430. On the YOG 83, see Fig. 431, the box was charred extensively on one side and end. A shipping tag on the end was undamaged while the wood was charred around it. On the LST 52, the box was scorched on the sides toward the blast. No damage was apparent on the remaining LSTs.

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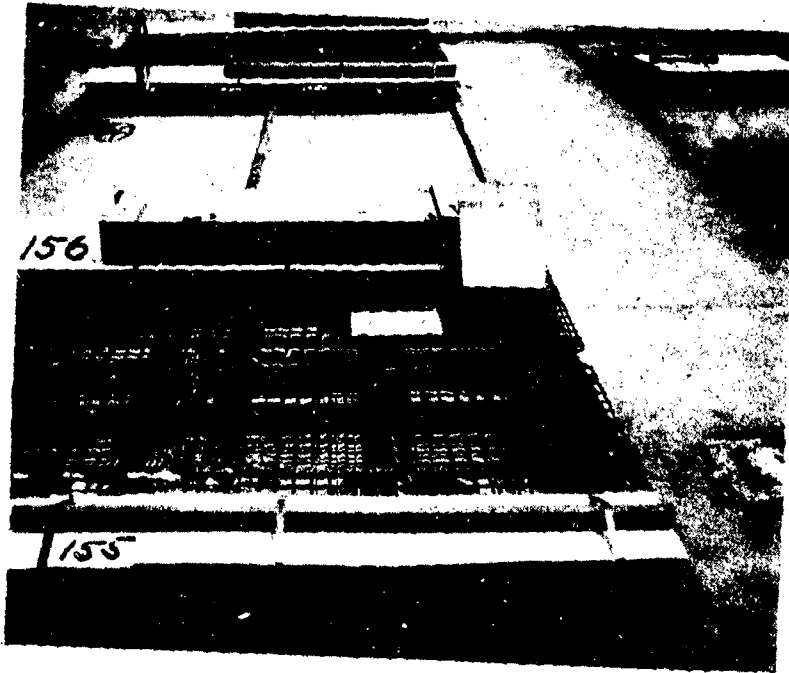


Fig. 425 - YOG 83 - Method of displaying Items 155 and 156.

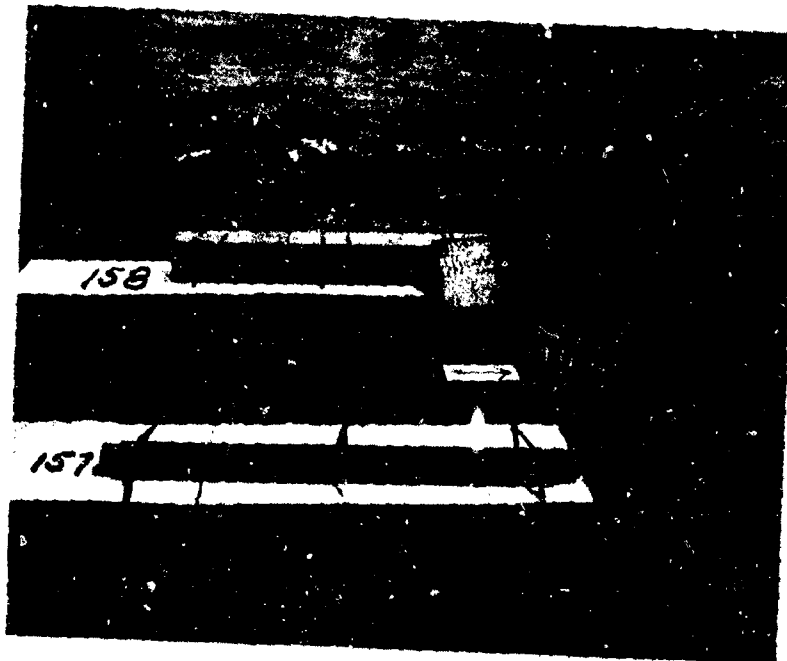


Fig. 426 - YOG 83 - Method of securing Items 157 and 158.

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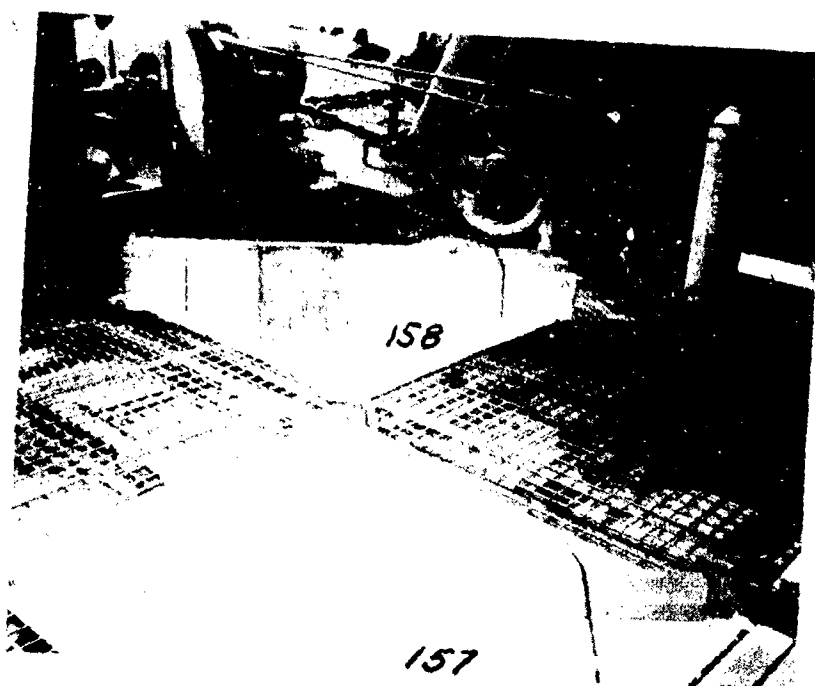


Fig. 427 - LST 52 - Method of displaying Items 157 and 158

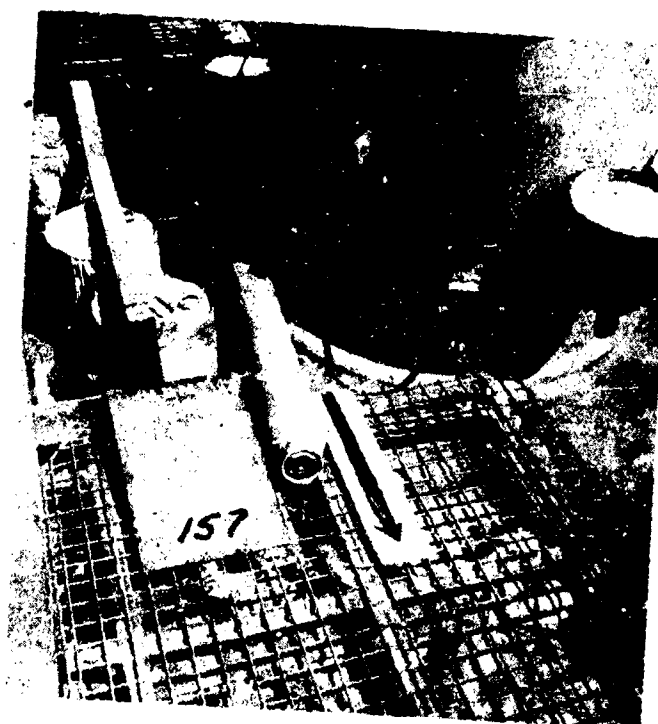


Fig. 428 - LST 52 - Damage to Item 157
after Test Able.

346

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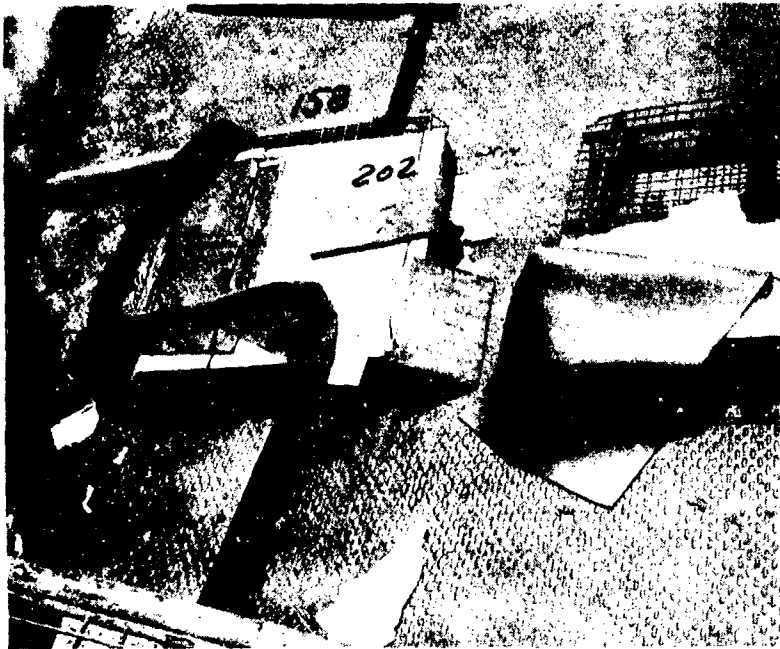


Fig. 429 - LST 52 - View after Test Able showing the displacement of Item 158 and damage to Item 202.

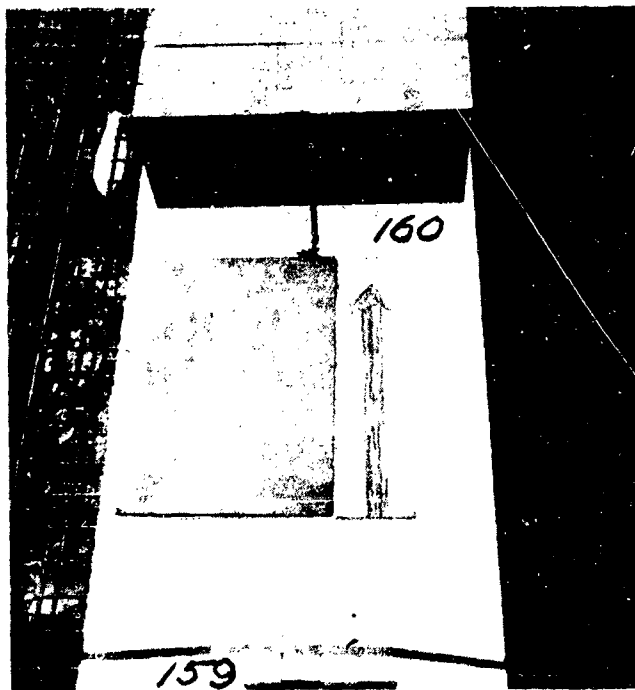


Fig. 430 - LST 661 - Method of displaying Items 159 and 160.

347
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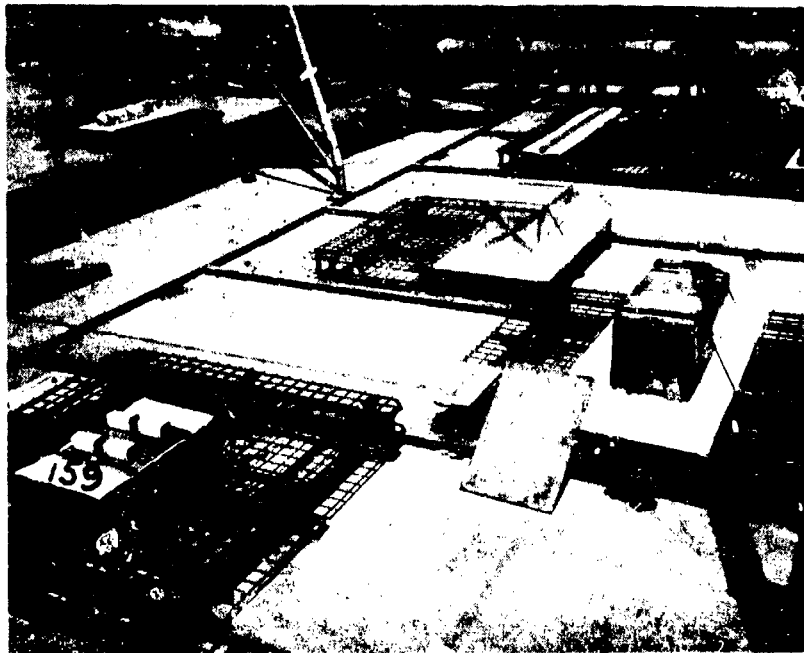


Fig. 431 - YOG 83 - Method of displaying Item 159.

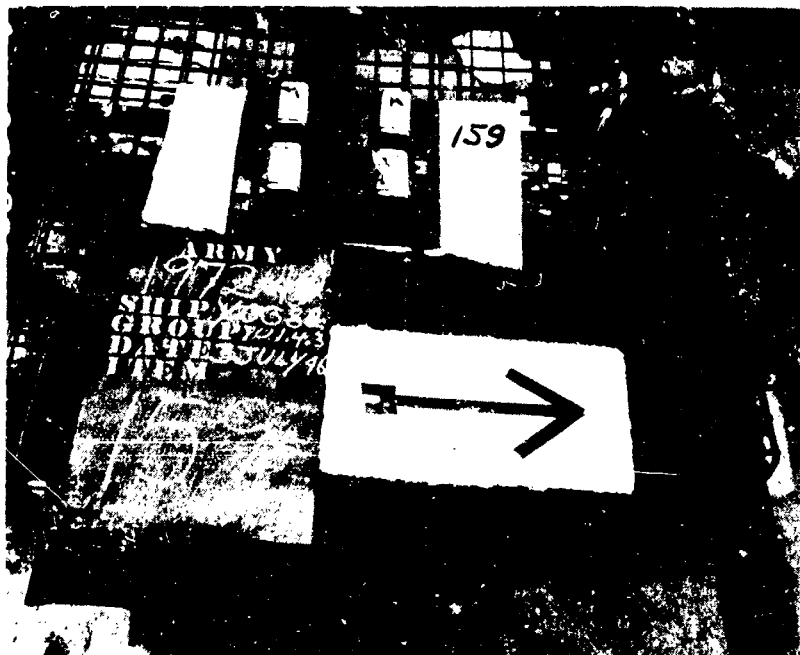


Fig. 432 - YOG 83 - Damage to Item 159 after Test Able.

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h. Block, Demolition, M2, 2-1/2 lb. (Item #161). Two were displayed bare, see Fig. 433. On the YOG 83, see Fig. 434 and Fig. 435, the chipboard covering was scorched and ripped extensively. The cardboard on the upper edge of the block had been burned away over an area of about 4 inches. The block was broken and the explosive was badly scorched. The fuse well covering on one of the blocks was badly scorched. The outside layer of the covering on the top and sides was charred and blown away. The markings were obliterated on the top and one side while those on the other side were partially legible. On the LST 52, see Fig. 436, the paper covering was partially burned off and the tetrytol charge was scorched on the exposed side. Before Test Able, the paper seal was missing on the fuse well. On the LST 661, the item was partially masked by the ramp. There was no damage apparent on the remaining ships.

i. Block, Demolition, M2, 2-1/3 lb. (Item #162). Two were displayed in a wooden box, see Fig. 437. On the YOG 83, Fig. 438 and Fig. 439 the top and end were charred extensively. The cleats on the lid were also charred. The rope handle was scorched and the markings were obliterated on both side and rear. On the LST 52, see Fig. 436, the box was scorched on the blast side. On the LST 661, the box was partially masked by an elevator ramp. There was no apparent damage on the other ships.

j. Block, Demolition, M3, 2-1/4 lb. (Item #163). Two were displayed bare, see Fig. 440. On the YOG 83, see Fig. 438 and Fig. 441, the cartons were crushed in strapping them to the pallet. The cardboard packing was scorched and torn and the markings were obliterated. Composition C3 was oozing out the end and upper corner of one of the blocks. On the LST 52, there was a slight exudate before Test Able. On the LST 661, the blocks were dented by strapping. There was no damage reported on any of the other ships.

k. Block, Demolition, M3, 2-1/4 lb. (Item #164). Two were displayed in a wooden box, see Fig. 440. On the YOG 83, see Fig. 434 and Fig. 441, the top, end, and side were charred and the markings obliterated. Mask marks made by the strapping were clearly visible. On the LST 52, the box was scorched except where it was masked. No damage was apparent on the other three ships.

l. Cratering Explosive, Ammonium Nitrate (Item #165). One was displayed bare, see Fig. 442. On the YOG 83, see Fig. 443 and Fig. 444, the top and unpainted portions

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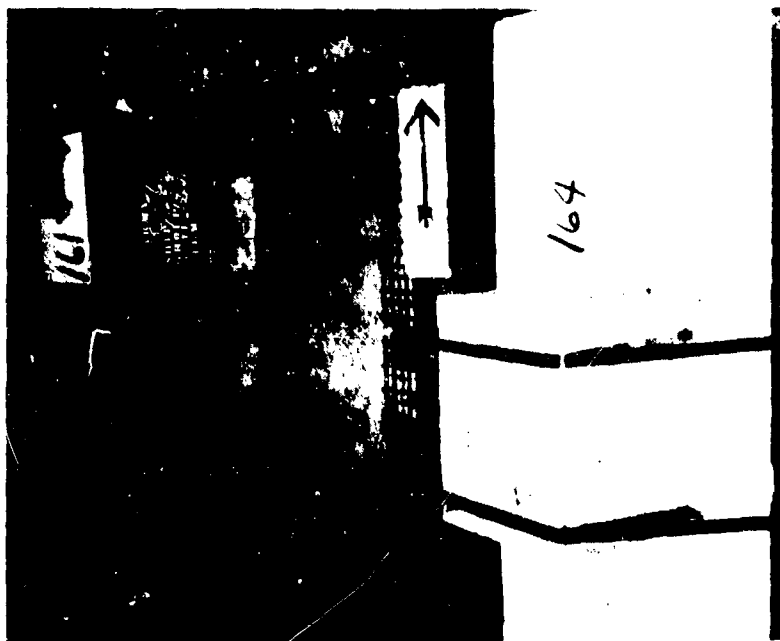


Fig. 434 - YOG 83 - Method of securing
Items 161 and 164.

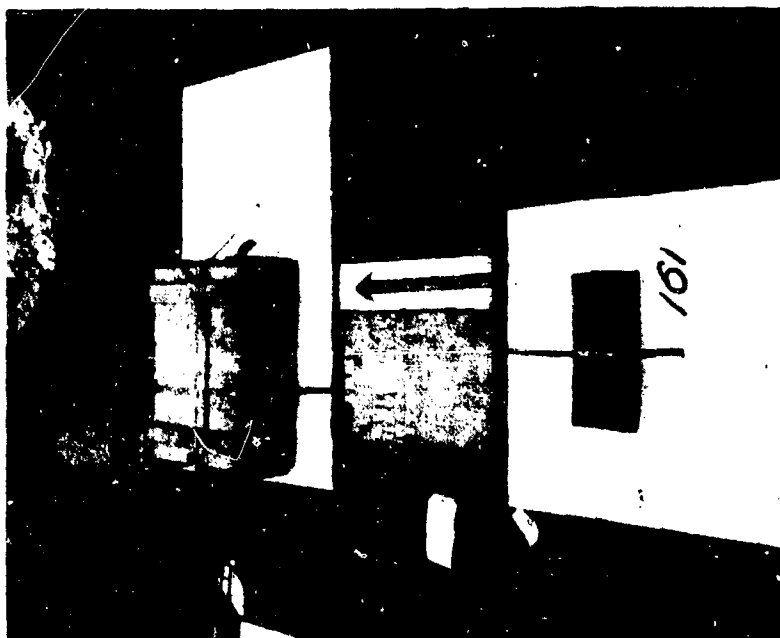


Fig. 433 - LSF 661 - Method of securing
Item 161.

350
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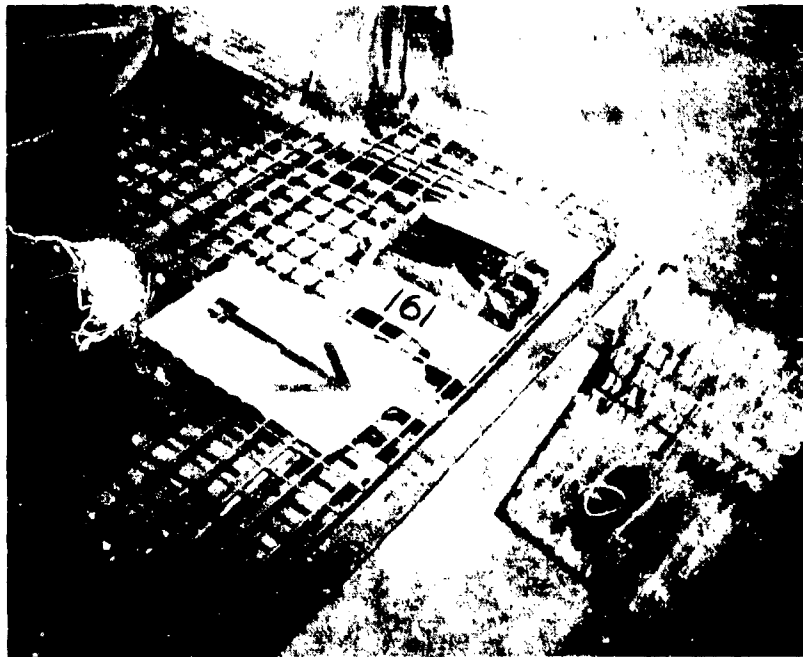


Fig. 435 - YOG 83 - Damage to Item 161 after Test Able.

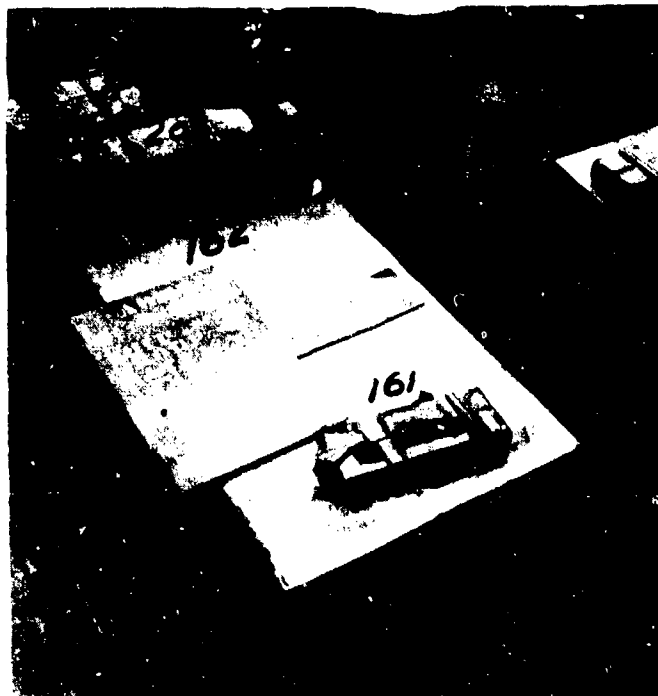


Fig. 436 - LST 52 - View after Test Able showing the damage to Items 161 and 162 and the displacement of Item 203.

351

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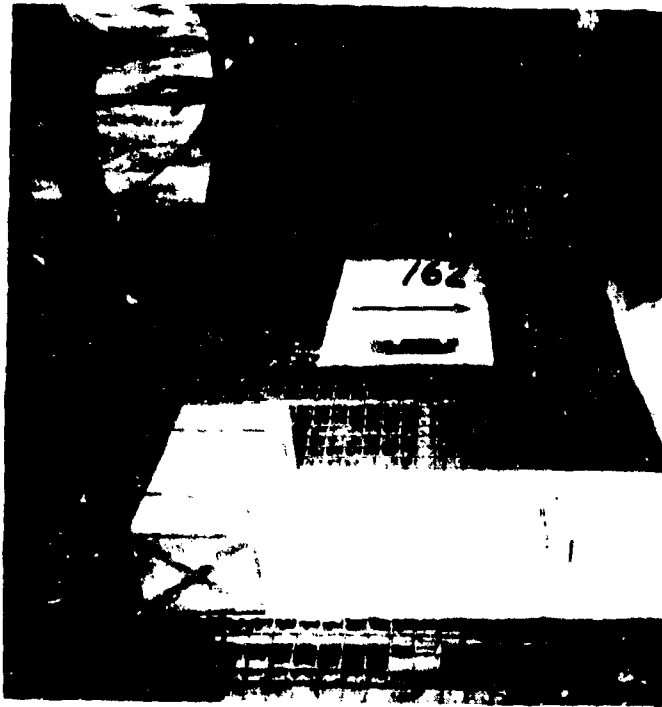


Fig. 437 - LST 52 - Method of displaying Item 162.



Fig. 438 - YOG 83 - Method of securing Items 162 and 163.

352
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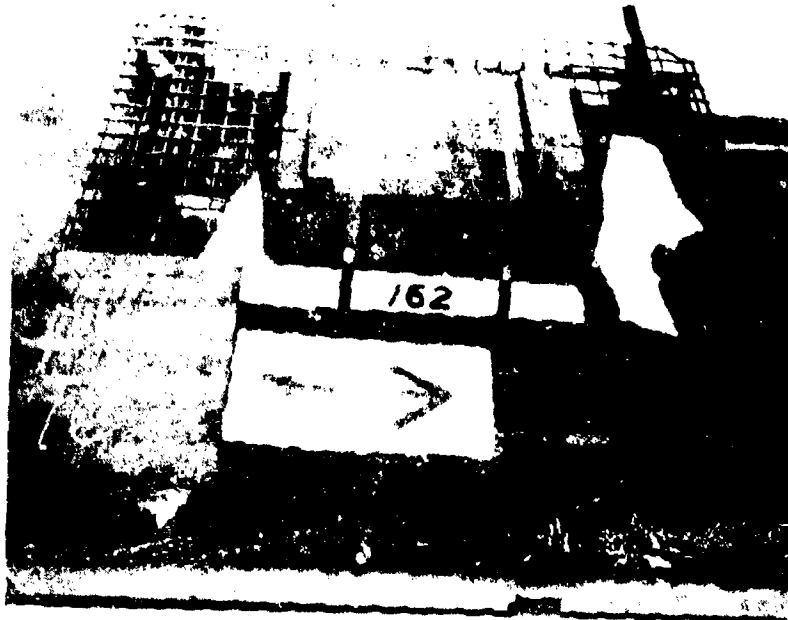


Fig. 439 - YOG 83 - Damage to Item 162 after Test Able.

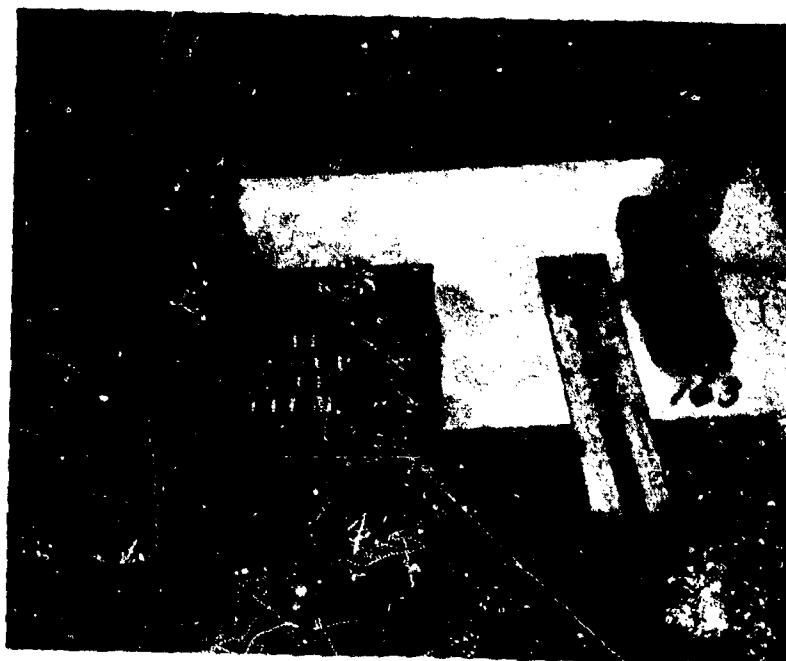


Fig. 440 - LST 661 - Method of securing Items 163 and 164.

353
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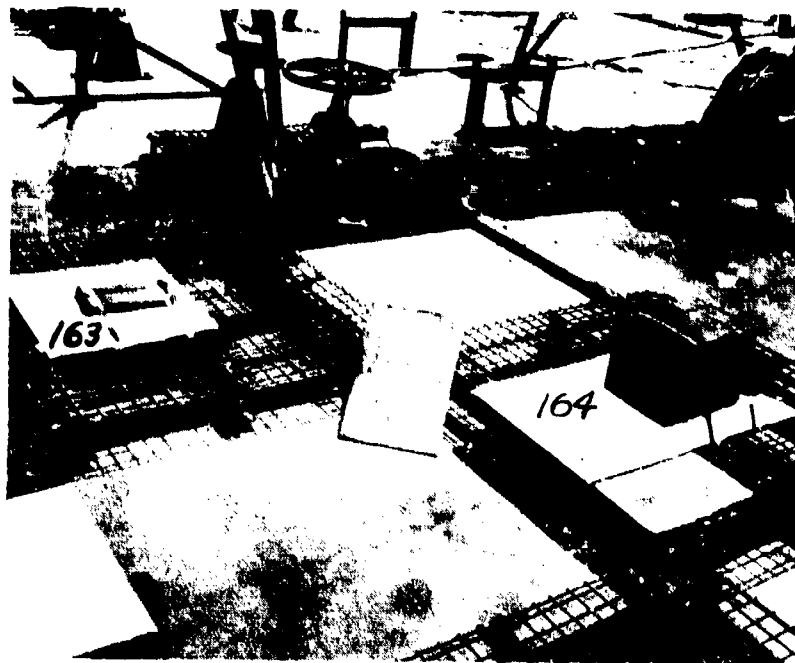


Fig. 441 - YOG 83 - Damage to Items 163 and 164 after Test Able.

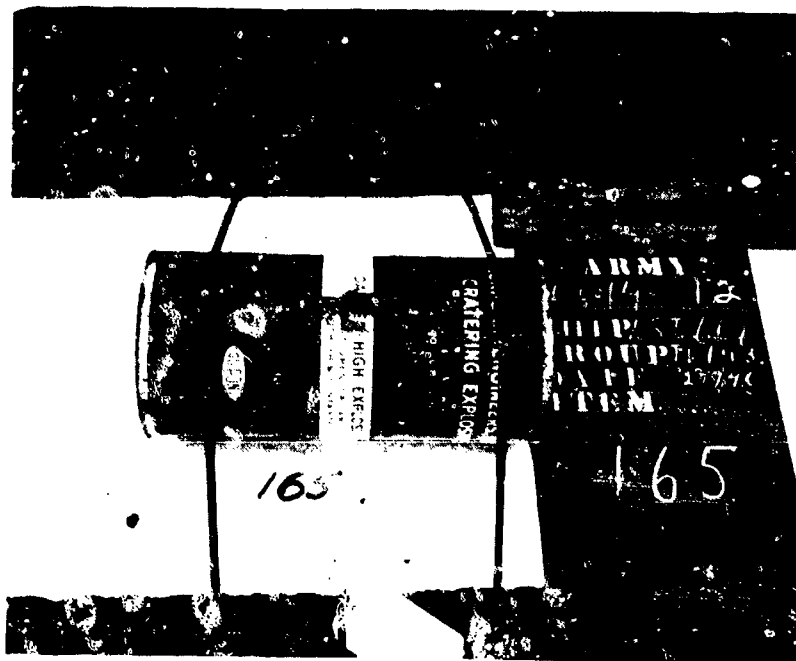


Fig. 442 - LST 661 - Method of securing Item 165.

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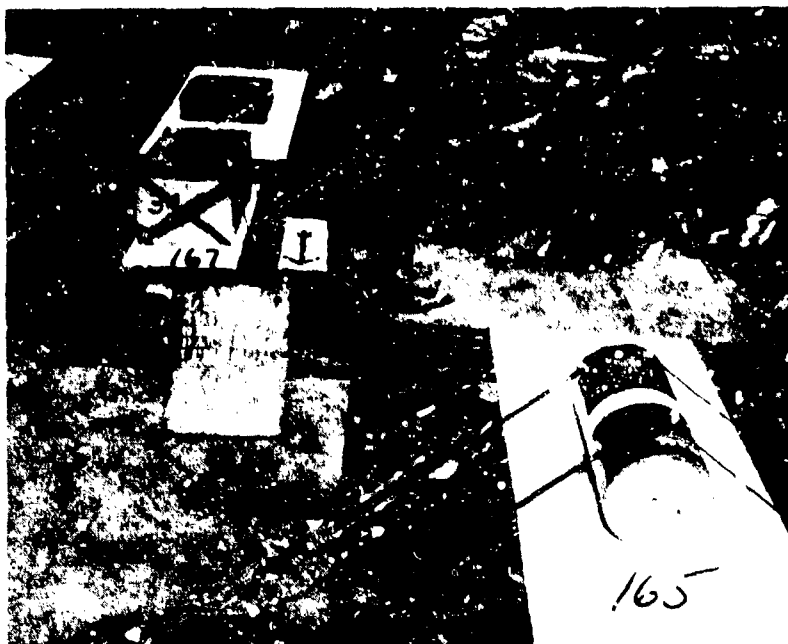


Fig. 443 - YOG 83 - Method of securing Items 165 and 167.



Fig. 444 - YOG 83 - Damage to Items 165 and 167 after Test Able.

355
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of the sides and ends were rusted and corroded. One side of the can was scorched and the paint had peeled. The seams had started to open but no explosive had leaked out. The side away from the blast was spattered with asbestos. On the LST 52, the container was dented around the edges by straps and the ends were rusted. This was masked by item #153 and a vent. There was no damage on any of the other ships.

m. Dynamite, 40% (Item #166). Three sticks were displayed bare, see Fig. 445. On the YOG 83, before the test, see Fig. 446, the paper wrapping on one stick started to open. After Test Able, see Fig. 447, this stick had melted and there was a pool of explosive on the metal plate. The paper wrapping on the other two sticks had been slightly opened. On the LST 52, see Fig. 448: the three sticks were broken in half by the blast and were held together only by the paper wrapping. The dynamite showed signs of decomposition and was therefore disposed of. There was no damage apparent on the remaining ships.

n. Dynamite, 40% (Item #167). Three sticks were displayed in a wood box, see Fig. 449. On the YOG 83, see Fig. 443 and Fig. 450, the top, end, and side of the box towards the bomb were scorched. The markings on these surfaces were obliterated. The side away from the blast was spattered with asbestos. On the LST 52, the box was scorched on the exposed side. No damage was reported on the other ships.

o. Cap, Blasting, Electric, #8 (Item #168). Six caps were displayed bare, see Fig. 451. On the YOG 83, see Fig. 452 and Fig. 453, one cap had detonated. Three caps showed evidence of heat and two were in good condition. The wires showed evidence of scorching and all of the shunts were blown off. The two caps which were in good condition were well covered by their lead wires so that the wires protected the caps from the heat. On the LST 52, the paper tubes covering the wires and caps were scorched on the ends. There was no damage to the wires or caps. No damage to this item was evident on any of the other ships.

p. Cap, Blasting, Electric, #8 (Item #169). Twelve caps were displayed in a paper box, see Fig. 451. On the YOG 83, see Fig. 454 and Fig. 444, the paper box was scorched on the top, end, and side. There was no damage to the item on any of the four remaining ships.

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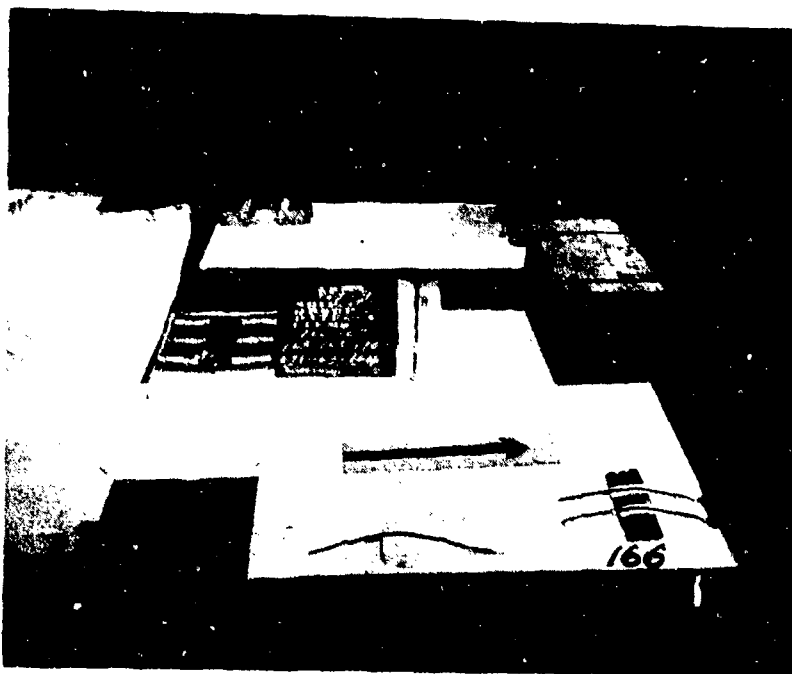


Fig. 445 - LST 52 - Method of securing Item 166.



Fig. 446 - YOG 83 - Method of securing Item 166.

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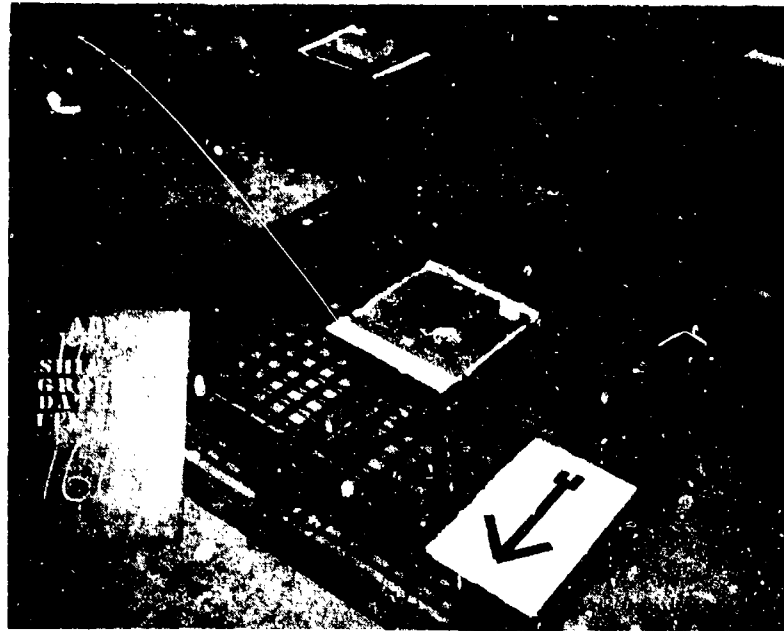


Fig. 447 - YOG 83 - Damage to Item 166 after Test Able.

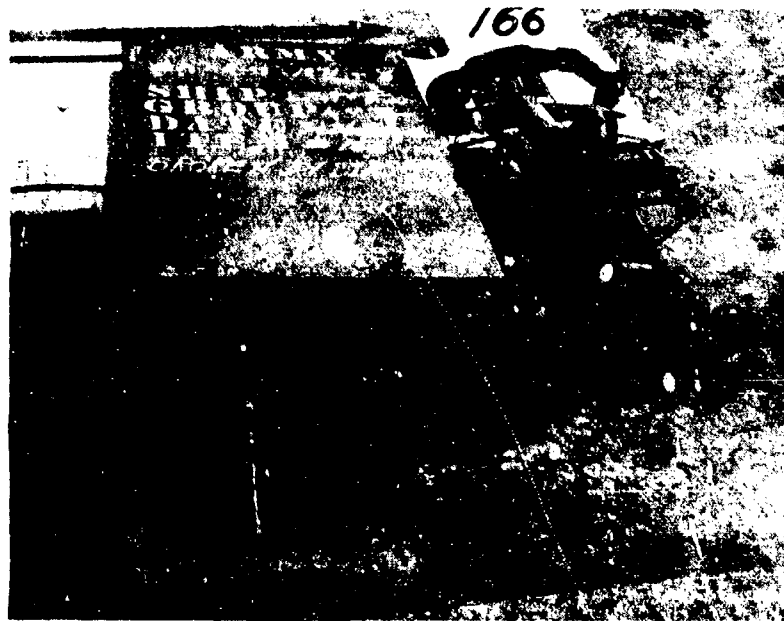


Fig. 448 - LST 52 - View of broken dynamite sticks (Item 166) after Test Able.

358
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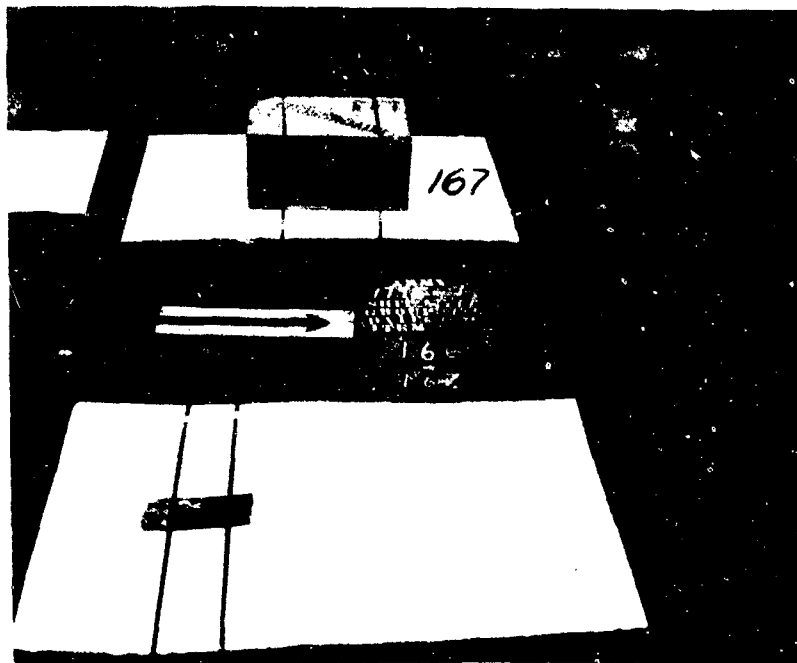


Fig. 449 - LST 661 - Method of securing Item 167.

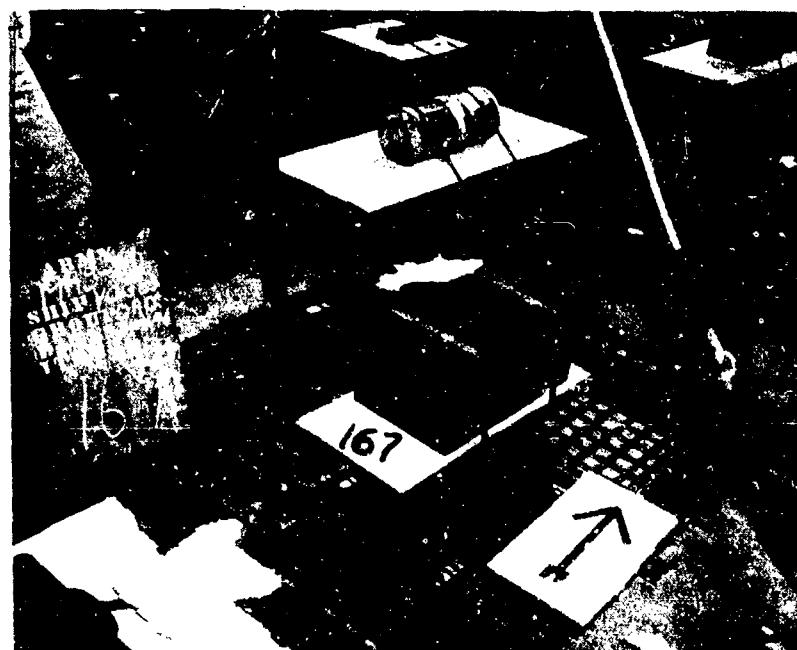


Fig. 450 - YOG 83 - Damage to Item 167 after Test Able.

359

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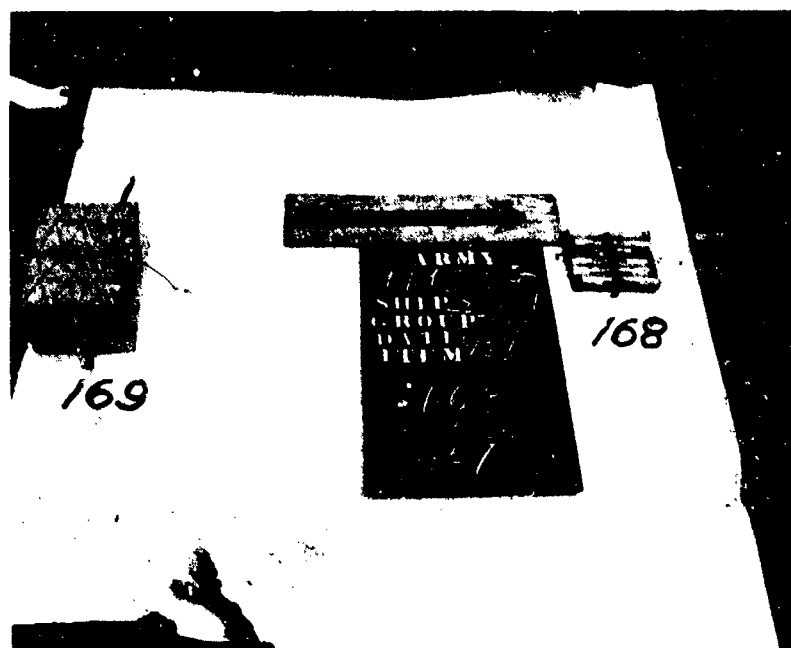


Fig. 451 - LST 661 - Method of securing Items 168 and 169.

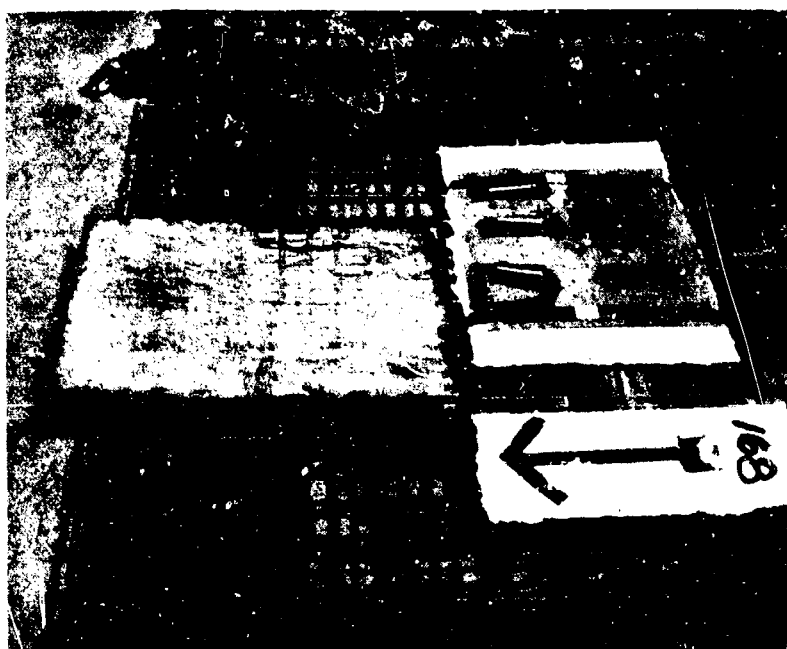


Fig. 452 - YOG 83 - Method of displaying Item 168.

360
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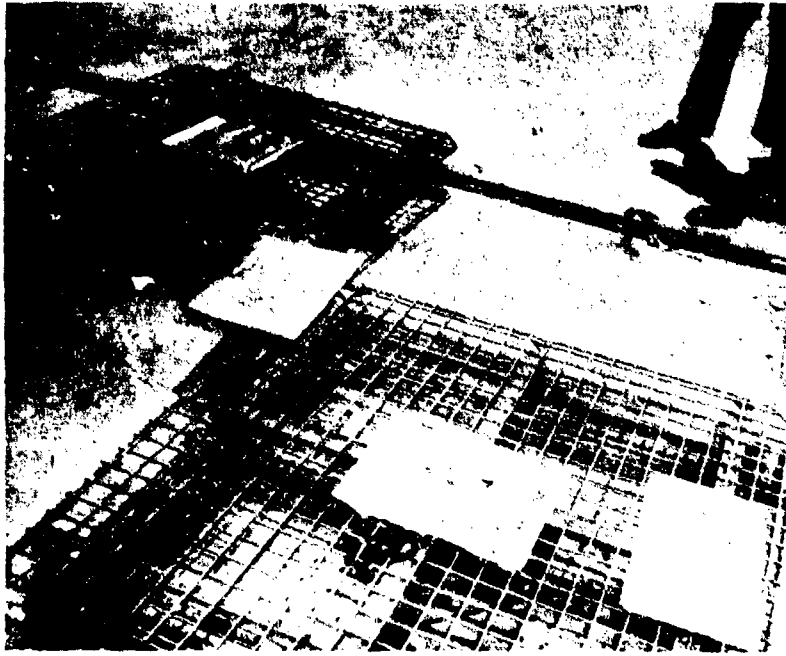


Fig. 453 - YOG 83 - View after Test Able showing the damage to Item 168 and the destruction of Item 170.

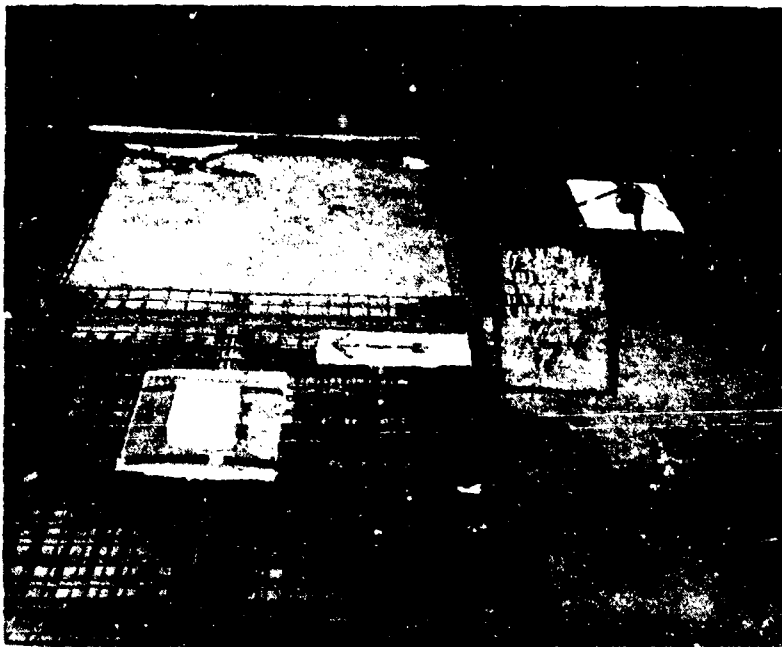


Fig. 454 - YOG 83 - Method of displaying Item 169.

361
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g. Cap, Blasting, Non-Electric, #8 (Item #170). Six caps were displayed bare, see Fig. 455. On the YOG 83, see Fig. 456 and Fig. 453, all were destroyed. On the LST 52, one cap was rotated 50°, but did not detonate. No damage was reported on the other ships.

h. Cap, Blasting, Non-Electric, #8 (Item #171). Twelve caps were displayed in a box, see Fig. 455. On the YOG 83, the box was scorched on the exposed surfaces but the caps did not detonate. On the remaining ships, there was no apparent damage.

i. Cord, Detonating (Item #172). Two 2 foot lengths were displayed bare on a metal plate, see Fig. 457. On the YOG 83, see Fig. 355 and Fig. 458, the cords showed a slight scorching on the top. There was no apparent damage to this item on the other ships.

j. Cord, Detonating (Item #173). Forty-six ft. of cord was displayed on a wooden spool, see Fig. 457. On the YOG 83, see Fig. 355 and Fig. 356, the end of the spool was scorched. The side of the cord roll was also scorched but did not detonate. On the LST 52, the cord covering was scorched on the top and side nearest the blast. No other damage was sustained on any of the remaining ships.

k. Detonator, Concussion, Type T1 (Item #174). The detonator was suspended 5 ft under the surface of the water, bare and armed, see Fig. 459 for a photo of the detonator as originally displayed on a pallet. On the YOG 83, the item was destroyed by functioning. On the LST 52, see Fig. 460, it was corroded due to immersion. No damage was apparent on the remaining ships.

l. Detonator, Concussion, Type T1 (Item #175). One detonator was displayed in a can, see Fig. 459. On the LST 52, the container was scorched on the exposed side and also dented by the straps. No damage was apparent on the remaining ships.

m. Set, Demolition, No. 2, Engr. Platoon, Complete, w/o explosives (Item #193). One set was displayed with the lid of the chest open, see Fig. 461. On the YOG 83, see Fig. 462, Fig. 463, and Fig. 464, the top was blown 19 feet forward from the chest and landed upside down. The exposed end of the chest was scorched slightly. No damage occurred to the items in the chest. On the LST 52, see Fig. 465, the chest was scorched on the end and the lid was closed violently by the blast, fracturing the plastic case containing the galvanometer. On the

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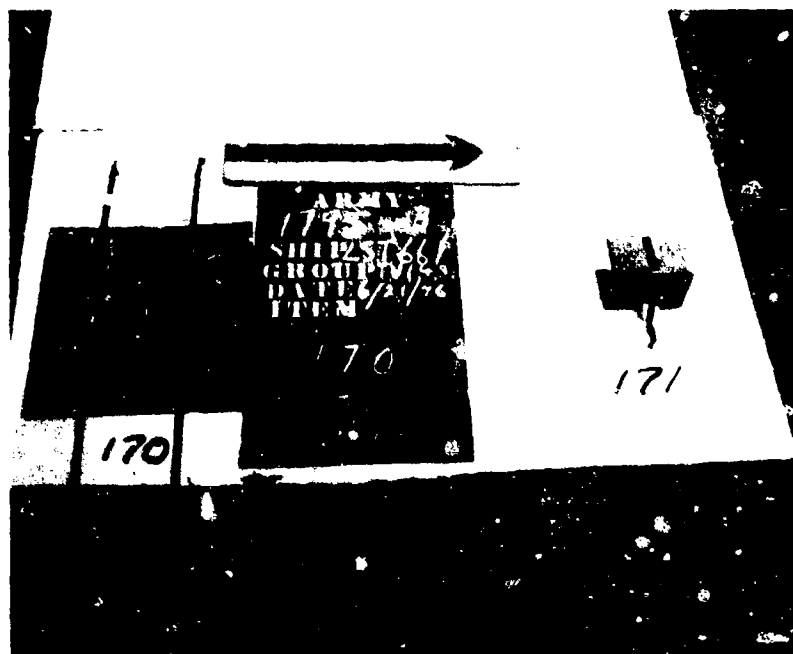


Fig. 455 - LST 661 - Method of securing Items 170 and 171

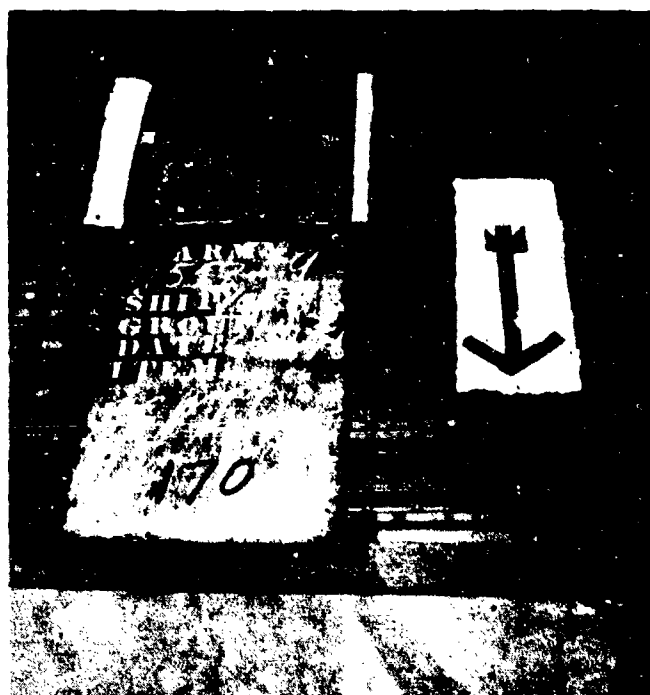


Fig. 456 - Y08 83 - Method of securing Item 170.

363
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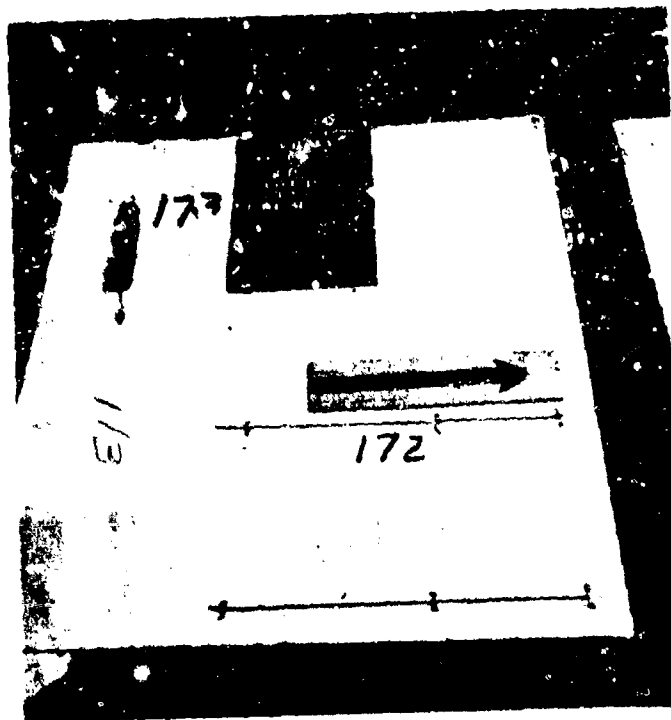


Fig. 457 - IST 661 - Method of securing Items 172 and 173.



Fig. 458 - YOG 83 - Method of displaying Item 172.

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Fig. 460 - LST 52 - Item 174 after Test Able.

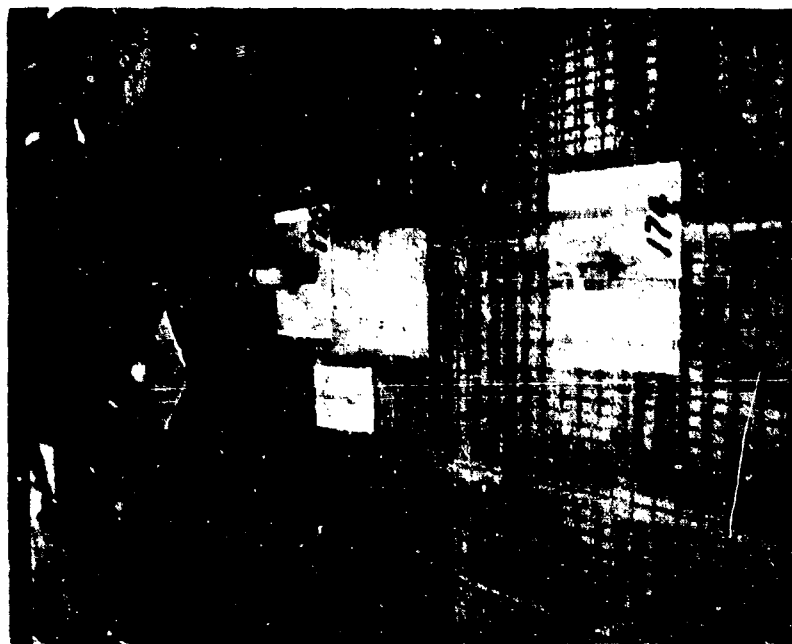


Fig. 459 - Y00 83 - Method of displaying Item 175.

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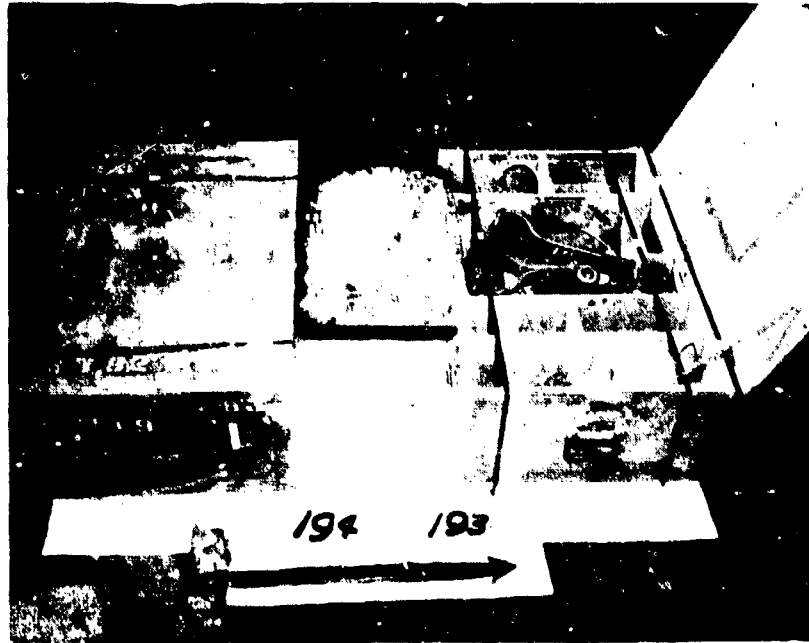


Fig. 461 - LST 52 - Method of displaying Items 193 and 194.

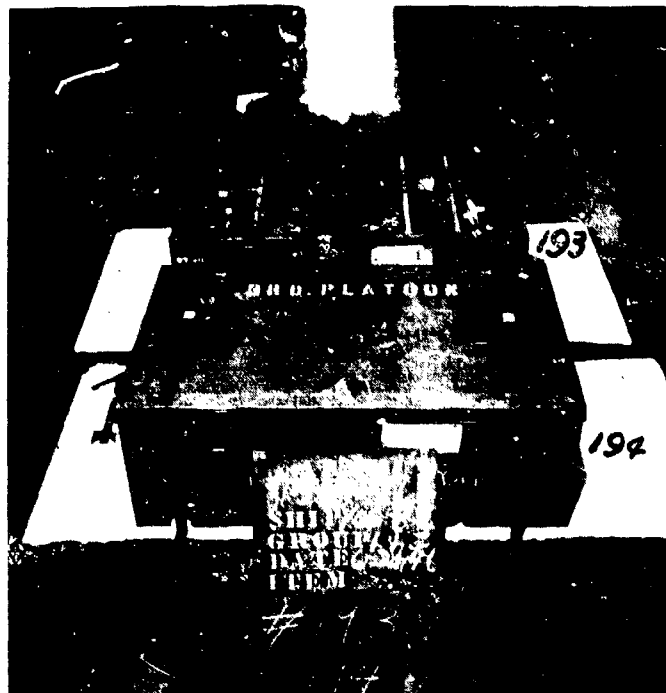


Fig. 462 - YOG 83 - Method of displaying
Items 193 and 194.

366
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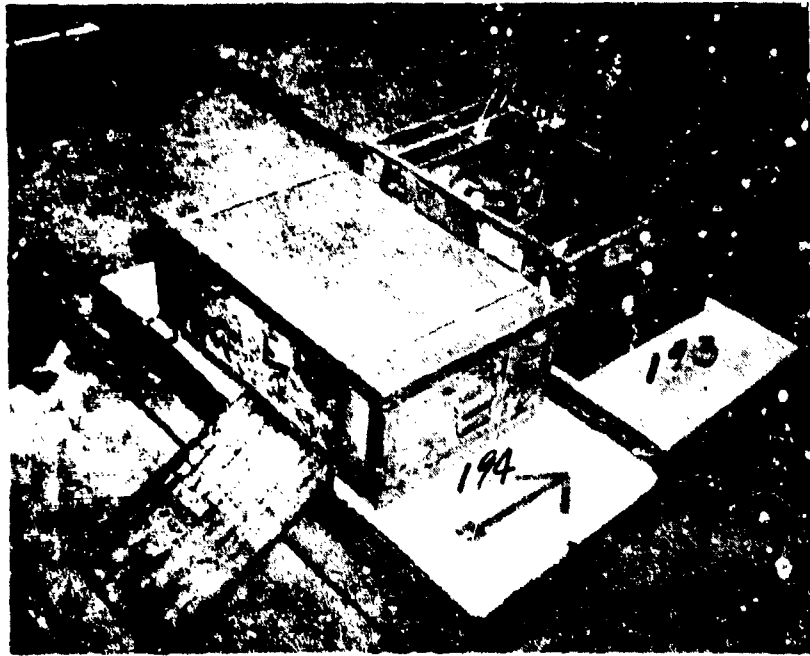


Fig. 463 - YOG 83 - Damage to Items 193 and 194 after Test Able.

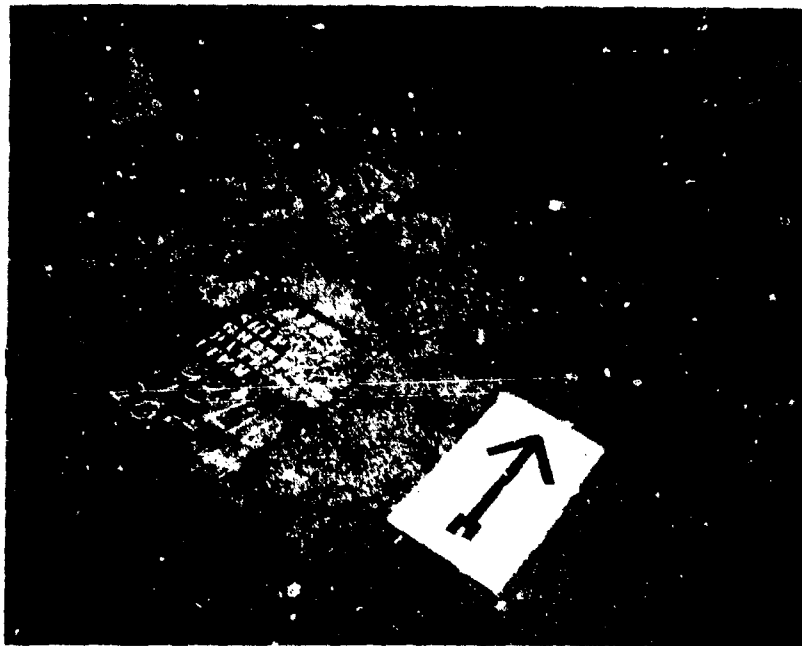


Fig. 464 - YOG 83 - View after Test Able showing the lid of Item 193 after being blown 20 feet.

367

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Fig. 465 - LST 52 - Damage to the galvanometer in Item 193 after Test Able.

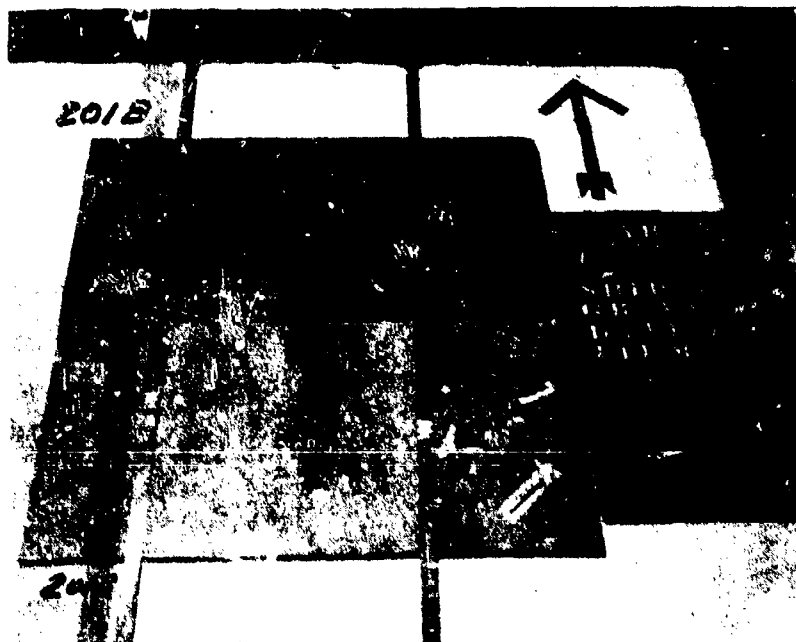


Fig. 466 - YOG 83 - Method of displaying rubber samples, Items 201 A and 201 B.

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LST 661, the chest was slightly scorched on the side exposed to the blast but the contents were undamaged. No damage was apparent on the two remaining LSTs.

X. Set, Demolition, No. 2., Engr. Platoon, Complete, w/o explosives (Item #149). One set was displayed in the closed chest, see Fig. 461. On the YOG 83, see Fig. 462 and Fig. 463, the items were not visibly damaged by the blast. The box was scorched on the end and rear but the markings were still legible. The marks made by the strap-ping were clearly visible. On the LST 52, the chest was scorched and the straps were broken. No damage was reported on the other ships.

Y. Fuse, Miners Safety (Item #193a). Four 4 ft. lengths were displayed on a metal plate. There was no apparent damage on any of the ships and the burning rate of the fuse was not changed by the test.

11. Rubber Samples

a. Neoprene (Gr-M) No. 1109N-208 (Item #201a). On the YOG 83, Fig. 466, the item was lost. There was no damage on the other ships.

b. Neoprene (GR-M-10) No. 1109N-209 (Item #201b). On the YOG 83, Fig. 466, the item was lost. There was no damage on the other ships.

c. GR-S Rubber (Item #202). Four sheets were displayed. On the YOG 83, Fig. 467 and Fig. 468, one of the sheets apparently was blown over the side, the other three remained at the display. The samples retained their color but were slightly charred. They were still spongy, soft, and retained their characteristic odor. On the LST 52, Fig. 469, Fig. 429, and Fig. 470, three pieces were displayed. One of these was not recovered and apparently had been lost over the side. No damage was incurred by the two remaining pieces. There was no apparent damage on the other three ships.

d. Buna N (Butaprene NEM) (Item #203). On the YOG 83, Fig. 471, the sample was blown over the side. On the LST 52, Fig. 472 and Fig. 435, the item was displaced but suffered no damage. There was no apparent change on the remaining three ships.

e. Natural Grade Rubber (Item #204). On the YOG 83, Fig. 473 and Fig. 474, the rubber sample was scorched and its painted identification marking was burned off. The sample was curled under the middle strap. One strap

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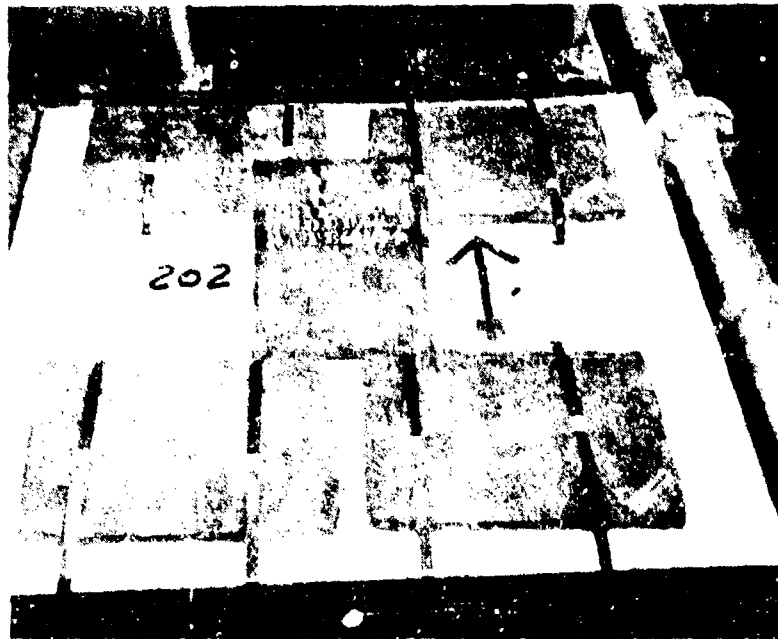


Fig. 467 - YOG 83 - Method of securing Item 202.

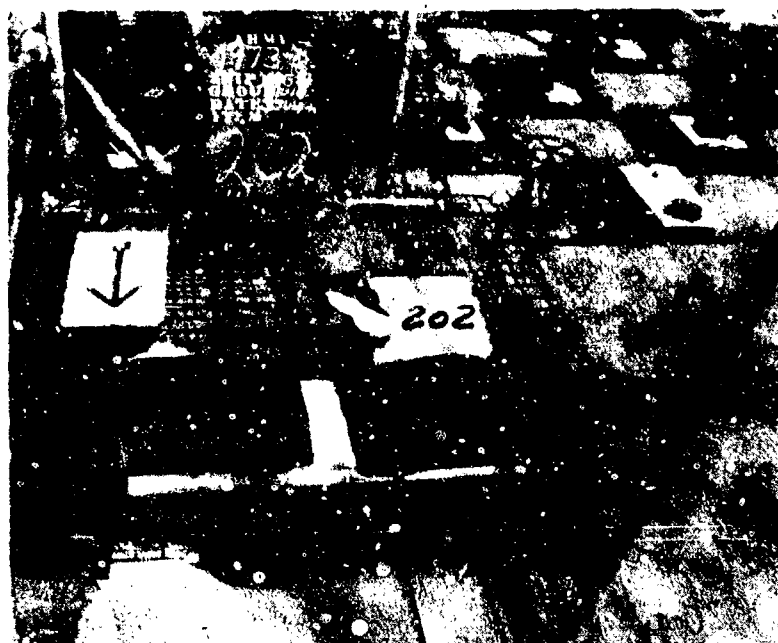


Fig. 468 - YOG 83 - View after Test Able showing the loss of one sheet of rubber and the damage to the remaining three, Item 202.

370

SECRET

SECRET



Fig. 469 - LST 52 - Method of displaying
Items 202 and 208.

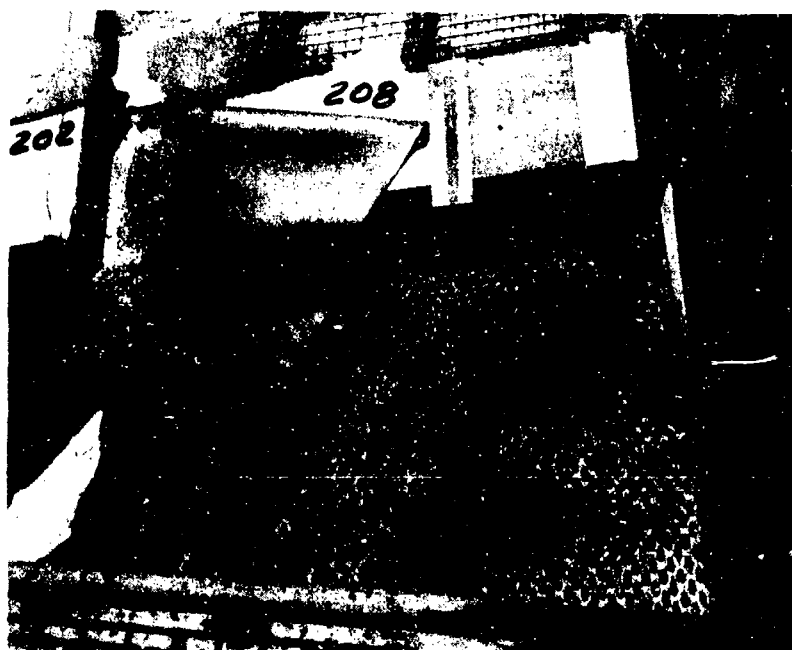


Fig. 470 - LST 52 - View after Test Able showing
the displacement of Items 202 and 208.

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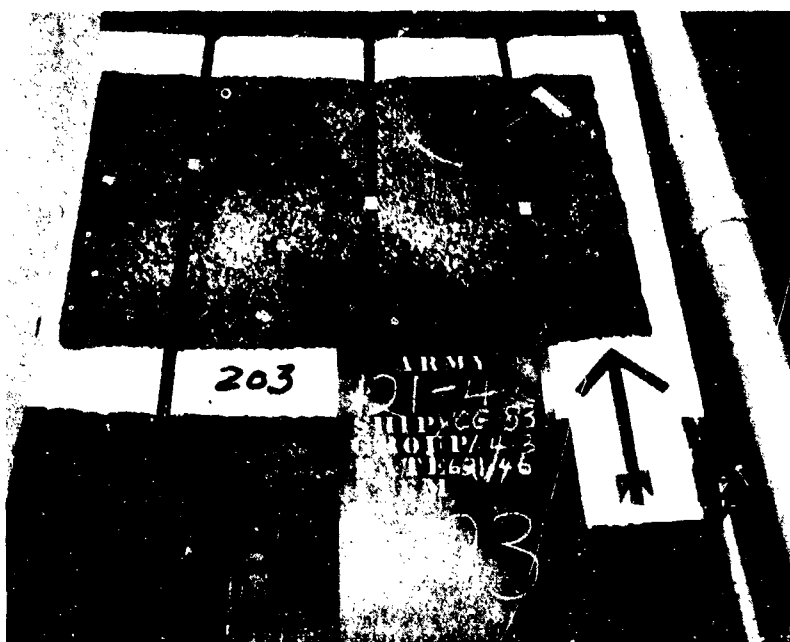


Fig. 471 - YOG 83 - Method of displaying Item 203.

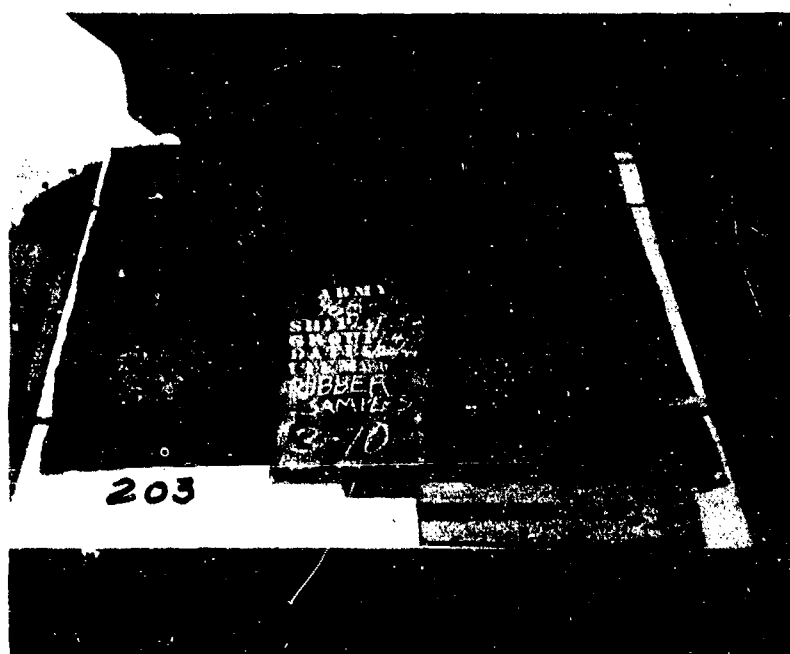


Fig. 472 - LST 52 - Method of securing Item 203.

372
SECRET

SECRET

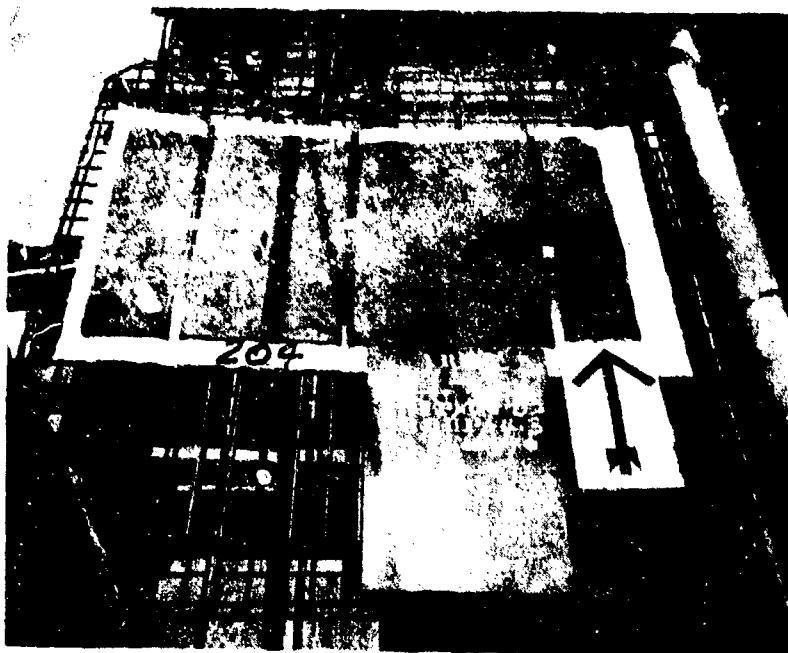


Fig. 473 - YOG 83 - Method of securing Item 204.

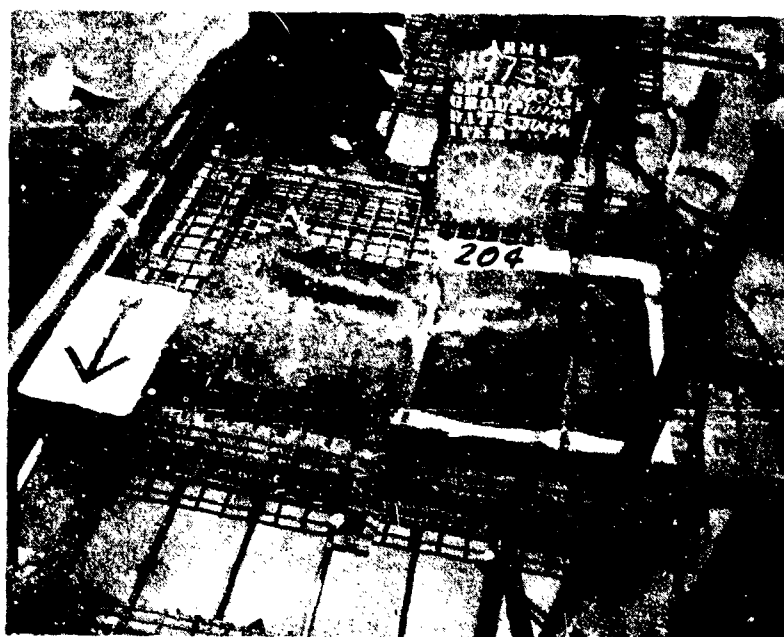


Fig. 474 - YOG 83 - Method of securing Item 204.

373
SECRET

SECRET

was blown off cutting a 7" slash in the sample. These straps were forced deeply into the rubber. No damage on the other ships was evident.

f. Black Butyl (Item #205). On the YOG 83, Fig. 475, the item was apparently blown over the side. There was no damage on the other ships.

g. White Butyl (Item #206). On the YOG 83, Fig. 476, the sample was blown off the pallet and was slightly scorched. On the LST 52, Fig. 477, the item was not recovered. It is believed to have been blown overboard by the blast. No damage was apparent on the other ships.

h. Gum Butyl (Item #207). On the YOG 83, Fig. 478, the item was blown off the pallet. It was scorched and some sticky fluid in the rubber had melted and could be seen on the surface. This was black and tended to obscure the original color of the sample. There was no damage on the other ships.

i. Black Perbunan (Item #208). On the YOG 83, Fig. 479, the item was apparently blown over the side. On the LST 52, Fig. 469 and Fig. 470, the item was displaced. There was no apparent primary damage to the item on this or the remaining ships.

j. White perbunan (Item #209). Fig. 480. On the YOG 83, this item was not displayed. On the LST 661, the color had changed to tan apparently due to exposure. No other damage was evident.

k. Gum Perbunan (Item #210). On the YOG 83, Fig. 481, the item was apparently blown over the side. There was no damage on the other ships.

l. See Fig. 482 for overall view of the condition of the rubber samples on the YOG 83.

SECRET

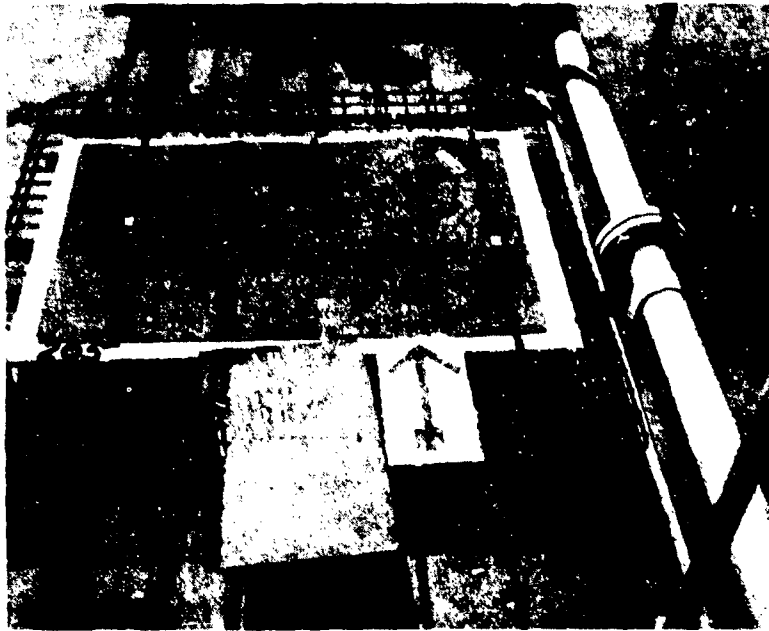


Fig. 475 - YOG 83 - Method of securing Item 205.



Fig. 476 - YOG 83 - Method of displaying Item 206.

375
SECRET

SECRET



Fig. 477 - LST 52 - Method of securing Item 206.

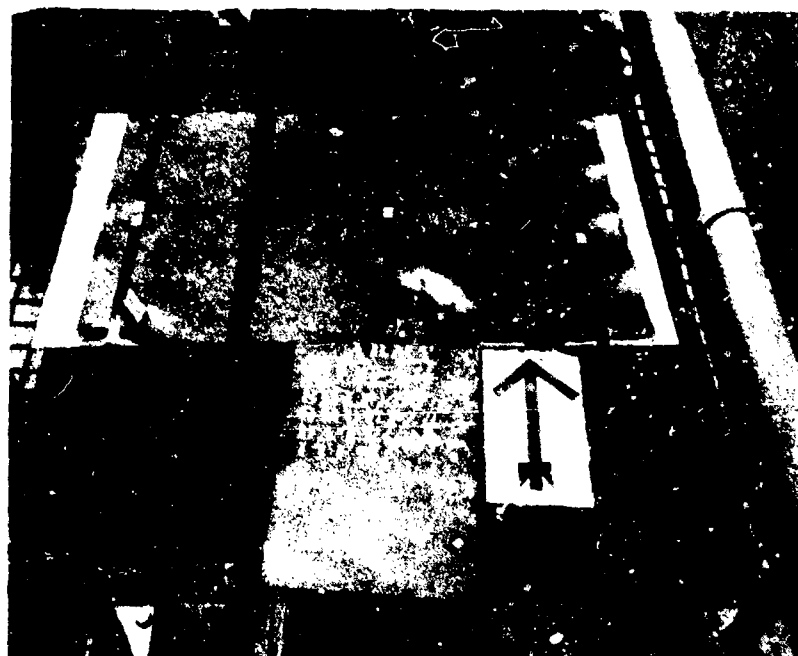


Fig. 478 - YOG 83 - Method of displaying Item 207.

376
SECRET

SECRET

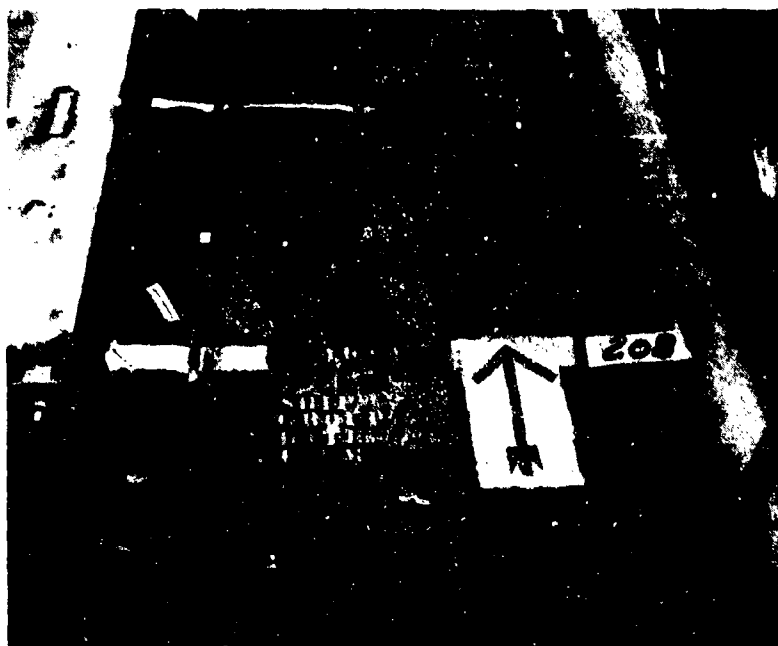


Fig. 479 - YOG 83 - Method of securing Item 208.



Fig. 480 - LST 545 - Method of securing Item 209.

377
SECRET

SECRET

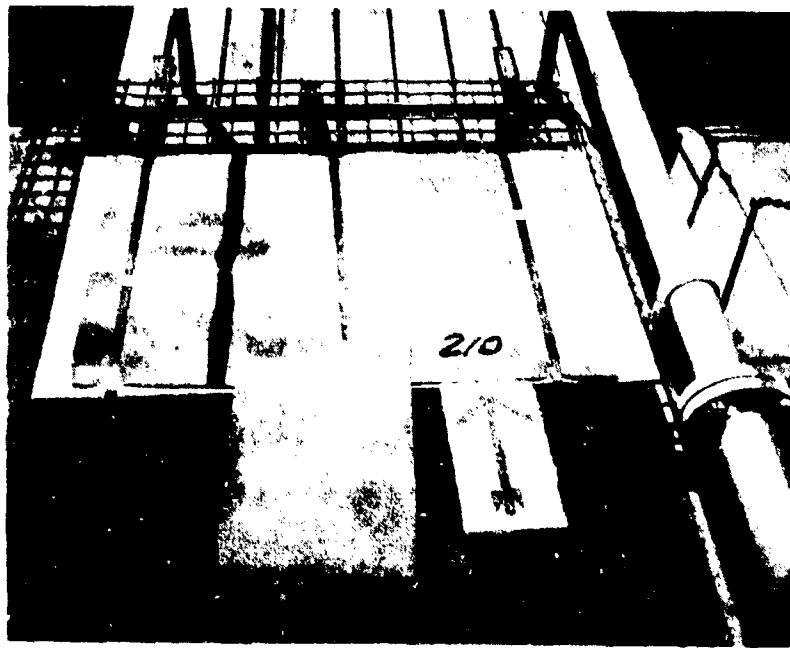


Fig. 481 - YOG 83 - Method of securing Item 210.

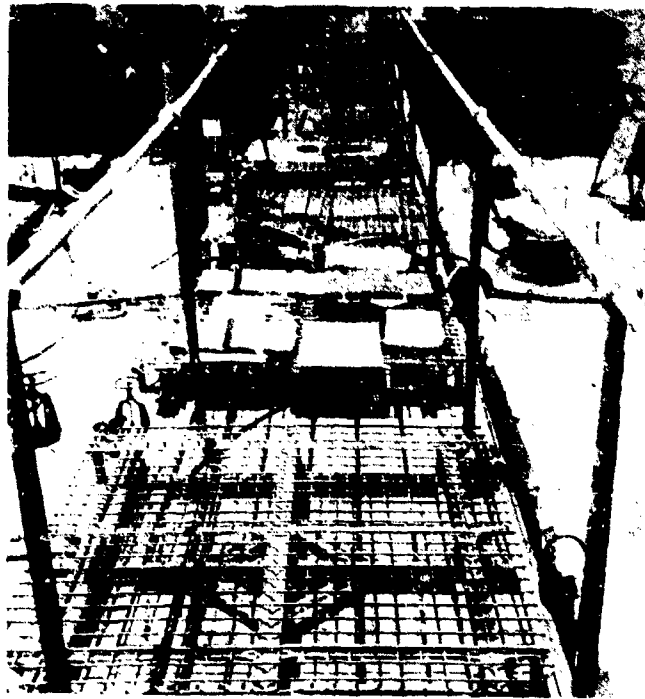


Fig. 482 - YOG 83 - View after Test Able,
showing the damage to the rubber
samples displayed on the catwalk.

378
SECRET

SECRET

F. TEST BAKER

1. Ordnance personnel were not permitted to go ashore or to reboard landing ships and craft until the island and the vessels had been declared safe from radioactivity. Five days after Baker Day, Bikini Island and the landing ships and craft that were nosed into the beach were declared safe. On Baker Day plus six, the LCT 1113 was declared safe for inspection and on Baker day plus 12, the LST 545 was declared free from radioactivity.

2. A thorough inspection revealed that no ordnance materiel was damaged by the direct action of the Baker Day Atomic bomb explosion.

a. In no case were the lashings torn loose or broken.

b. Some deterioration (rust) of material had started from the effects of salt water spray but the damage was insignificant.

c. The only instance of damage to Ordnance equipment was to the M8 Armored Car aboard the LCT 1187. The LCT had settled in the water partially submerging the armored car at high tide. This vehicle would not start until after it had been towed ashore and thoroughly cleaned. It is now in serviceable condition.

SECRET

APPENDICES

- A. LIST OF ESTABLISHMENTS INVESTIGATING TEST SAMPLES**
- B. SERIAL NUMBERS OF MATERIEL TEST ITEMS**
- C. LIST OF PHOTOGRAPHS NOT APPEARING IN REPORT**
- D. MASTER DATA LIST FOR AMMUNITION DISPLAY**
- E. DISPLAY DRAWINGS OF TARGET SHIPS**
- F. MASTER LIST OF TEST BAKER MATERIEL**
- G. TEST BAKER MATERIEL ON MAJOR SHIPS**
- H. LOCATION OF TEST BAKER MATERIEL ON LCTS AND LSTS**
- I. LAYOUT OF TEST BAKER MATERIEL ON BIKINI ISLAND**

SECRET

APPENDIX A

**LIST OF ESTABLISHMENTS INVESTIGATING
TEST SAMPLES**

381

SECRET

SECRET

LIST OF ESTABLISHMENTS INVESTIGATING TEST SAMPLES

Following Atomic Bomb Test Able, certain items of Ordnance equipment, materiel and ammunition were shipped to appropriate agencies in the United States for further testing, analysis and study. Additional technical data on tested equipment, materiel and ammunition will be made available by Office of the Chief of Ordnance or by the appropriate Ordnance Department agency. Listed below are the names and addresses of agencies mentioned above with a list of items of equipment, materiel or ammunition that were shipped to each.

Ordnance Research and Development Center
Aberdeen Proving Ground, Maryland

Materiel
Item No.

Nomenclature

1. Carbine, Cal. .30, M2
2. Gun, Machine, Cal. .30, M1917A1
3. Gun, Machine, Cal. .50, HB, M2, (From-Mount, Mult. MG, M45)
4. Gun, Machine, Cal. .50, HB, M2, (From-Mount, Mult. MG, M45)
6. Gun, Machine, Cal. .30, M1919A4
7. Gun, Machine, Cal. .60, T17E3
8. Gun, Submachine, Cal. .45, M3A1
12. Launcher, Rocket, 2.36", M9E2
13. Pistol, Automatic, Cal. .45, M1911A1
14. Rifle, Browning, Automatic, M1918A2
15. Rifle, Recoilless, 75mm, M20
16. Rifle, US, Cal. .30, M1C
17. Shotgun, 12 ga. Riot Type w/lug
18. Gun, Automatic, 20mm, AC M3
19. Gun, 75mm, AC, M10, w/Mount M10 and Feed Mech M4
22. Gun, 40mm, AA, M2 w/Mount, Gun, 40mm, AA, M2A1
23. Gun, 90mm, AA, M2, w/Mount, Gun, 90mm, AA, M2
24. Gun, 155mm, M2, w/Carriage Gun, 155mm, M1A1
25. Howitzer, 105mm, M2A2, w/Carriage, Howitzer, 105mm, M2A2
26. Launcher, Rocket, 4.5", TG6E2
27. Mortar, 81mm, M2
55. Car, Armored, Light, M8
56. Carriage, Gun, Motor, Mult. M16
58. Carrier, Jargo, M29C
60. Tank, Light, M24
61. Truck, 1/4 ton, 4x4
- Tire, 600x16, (From-Truck 1/4 ton 4x4)
- Trigger Mechanism (From-Gun, Machine Cal. .60, T17E3)
- Feed Mechanism (From-Gun, Automatic, 20mm, AC, M3)
- Tripod, Cal. .60 M3, (From-Car, Armored, Light, M8)
- Samples of Oil

SECRET

Ammunition Item No.

Nomenclature

201A	Neoprene (GR-M) No. 1109N-208
201B	Neoprene (GR-M-10) No. 1109N-209
202A	GR-S Rubber (Piece A)
202B	GR-S Rubber (Piece B)
202C	GR-S Rubber (Piece C)
202D	GR-S Rubber (Piece D)
203	Buna-N (Butaprene NXM)
204	Natural Grade Rubber
205	Black Butyl
206	White Butyl
207	Gum Butyl
208	Black Perbunan
209	White Perbunan
210	Gum Perbunan

Frankford Arsenal, Philadelphia, Penn.

Material Item No.

Nomenclature

28.	Binocular, M15A1
29.	Circle, Aiming, M1
30.	Clock, Message Center, M1
31.	Director, M7A1B1
32.	Director, M9A1, w/Trailer, M14
33.	Finder, Height, M1A1
34.	Finder, Range, M7
35.	Mount, Periscope, M66, (From-Tank, Light, M24)
36.	Mount, Telescope, M2A1 (From-Carriage, Howitzer, 105mm, M2A2)
37.	Mount, Telescope, M65, (From-Tank, Light, M24)
38.	Oil Gear, M3, Elevation (From-Carriage, 40mm, AA, M2A1)
29.	Periscope, M4A1
39a.	Periscope, M10F (From-Tank, Heavy, M26)
40.	Quadrant, Elevation, M9 (From-Gun, 90mm, AA, M2)
41.	Quadrant, Gunners, M1 (Mount)
42.	Quadrant, Range, M4 (From-Carriage, Howitzer, 105mm, M2A2)
43.	Sight, M4, (From-Mortar, 81mm, M2)
44.	Sight, Computing, M7A1, (From-Gun, 40mm, AA, M2)
45.	System, Cable, M1
46.	Telescope, M71 (From-Tank, Light, M24)
47.	Telescope, T108M2
48.	Telescope, BC, M65
49.	Telescope, Elbow, M17 (From-Director, M9A1)
50.	Telescope, Elbow, M16A1, (From-Carriage, Howitzer, 105mm, M2A1)
51.	Telescope, Panoramic, M12, (From-Carriage, Howitzer, 155mm, M2A1)
52.	Unit, Generating, M7A1, w/Trailer, M7
53.	Watch, Pocket, RR Type
54.	Watch, Wrist
—	Telescope, M82, (From-Rifle, US, Cal. .30, M16)
—	Telescope, M17 (two) (From-Director, M7A1B1)
—	Tubes, Radio (10) (From-Director, M9A1)

SECRET

Ammunition Item No.	Nomenclature	Lot No.
1.	Cart., Ball, Cal. .30, M2	LC13305
2.	Cart., Ball, Cal. .30, M2	BAL75286
3.	Cart., Ball, Cal. .30, M2	TWB82923
4.	Cart., Ball, Cal. .30, M2	LC13305
5.	Cart., Ball, Cal. .30, M2	LC13305
6.	Cart., AP, Cal. .50, M2	LC13235
7.	Cart., AP, Cal. .50, M2	SOIL-88056
8.	Cart., AP, Cal. .50, M2	LC13235
9.	Cart., AP, Cal. .50, M2	TWL103061
10.	Cart., Tracer, Cal. .50, M10	TW18198
11.	Cart., Tracer, Cal. .50, M10	OAL105264
12.	Cart., Tracer, Cal. .50, M10	TW18198
13.	Cart., Tracer, Cal. .50, M10	DM20085
14.	Shell, Shotgun, Brass, M19	WRA22042
15.	Shell, Shotgun, Brass, M19	WRA22042
16.	Shell, Shotgun, Brass, M19	WRA22042
17.	Shell, Shotgun, Paper, #80.S.	WCC6496
18.	Shell, Shotgun, Paper, #80.S.	WCC6496
19.	Shell, Shotgun, Paper, #80.S.	WCC6496
20.	Cart., Ball, Cal. .45, M1911	EC-S-25287
21.	Cart., Ball, Cal. .45, M1911	EC-S-25287
22.	Cart., Ball, Cal. .45, M1911	EC-S-25287
186.	Cart., Incend. Cal. .50, M23	LC12017
187.	Cart., Incend. Cal. .50, M23	LC12017
188.	Cart., Incend. Cal. .50, M23	LC12017
189.	Cart., Incend. Cal. .50, M23	LC12017

Watertown Arsenal, Watertown, Mass.

Materiel Item No.	Nomenclature
9.	Helmet, Steel, M1

Rock Island Arsenal, Rock Island, Ill.

Materiel Item No.	Nomenclature
10.	Holster, Pistol, M1916
20.	Paracaisson, M9A2
21.	Parachest, M8A1

Springfield Armory, Springfield, Mass.

Materiel Item No.	Nomenclature
11.	Knife, Trench, M4, w/Scabbard, M8A1

SECRET

Picatinny Arsenal, Dover, New Jersey

Ammunition Item No.	Nomenclature	Lot No.
25.	Cart., TP, M99 (T24) 20mm AC Guns	PA-56-1
26.	Cart., TP, M99 (T24) 20mm AC Guns	PA-56-1
27.	Cart., M306, 57mm, Rifle	PA-57-1-X
28.	Cart., M306, 57mm, Rifle	PA-57-1-X
29.	Cart., M306, 57mm Rifle	PA-57-1-X
30.	Shell, HE, M43A1, w/o Fuze, 81mm Mortar	WC-9-226
31.	Shell, HE, M43A1, w/o Fuze, 81mm Mortar	WC-9-226
32.	Shell, HE, M43A1, w/o Fuze, 81mm Mortar	WC-9-226
33.	Shell, HE, M56, w/o Fuze, 81mm Mortar	IOP-19-45
34.	Shell, HE, M56, w/o Fuze, 81mm Mortar	IOP-19-45
35.	Shell, HE, M56, w/o Fuze, 81mm Mortar	IOP-19-45
37.	Shell, WP, M57, w/o Fuze, 81mm Mortar	IOP-20-30
39.	Shell, FS, M57, w/o Fuze, 81mm Mortar	EA-7866-4
40.	Shell, FS, M57, w/o Fuze, 81mm Mortar	EA-7866-4
41.	Shell, FS, M57, w/o Fuze, 81mm Mortar	EA-7866-4
42.	Shell, Semi-fixed, HE, M1, w/o Fuze, 105mm Howitzer	EOP 6959-19
43.	Shell, Semi-fixed, HE, M1, w/o Fuze, 105mm Howitzer	EOP 6959-19
44.	Shell, Semi-fixed, WP, M60, w/o Fuze, 105mm Howitzer	RDOP-2-22568-31
45.	Shell, Semi-fixed, WP, M60, w/o Fuze, 105mm Howitzer	RDOP-2-22568-31A
46.	Charge, Prop, 155mm Guns, M1, M1A1	NH 30461
47.	Charge, Prop, 155mm Guns, M1, M1A1	NH 30461
48.	Charge, Prop, 155mm Guns, M1, M1A1	NH 30461
52.	Fuze, TM, M43A1, w/o Booster	FA-2760-8
53.	Fuze, TM, M43A1, w/o Booster	FA-2760-8
54.	Fuze, TM, M43A1, w/o Booster	FA-2760-8
58.	Fuze, PD, M48A2, w/o Booster	SOP-SR-72
59.	Fuze, PD, M48A2, w/o Booster	SOP-SR-72
60.	Fuze, PD, M48A2, w/o Booster	SOP-SR-72
64.	Fuze, PD, M52A1, w/o Booster	WC-42-172
65.	Fuze, PD, M52A1, w/o Booster	WC-42-172
66.	Fuze, PD, M52A1, w/o Booster	WC-42-172
67.	Fuze, T&SQ, M54, w/o Booster	AOP-3-3
68.	Fuze, T&SQ, M54, w/o Booster	AOP-3-3
69.	Fuze, T&SQ, M54, w/o Booster	AOP-3-3
73.	Fuze, VT, T76E6, w/Booster	2164
74.	Fuze, VT, T76E6, w/Booster	2164
75.	Fuze, VT, T76E6, w/Booster	2164
76.	Fuze, VT, T76E6, w/o Booster	6136
77.	Fuze, VT, T76E6, w/o Booster	6136
78.	Fuze, VT, T76E6, w/o Booster	6136
80.	Fuze, Rocket, Base, Mk146, w/o Booster	HMC-107
81.	Head, Rocket, HE, 7.2" T 37 w/o Fuze	GR-26
82.	Head, Rocket, HE, 7.2" T 37 w/o Fuze	GR-26
84.	Motor, Rocket, 2.25", Mk3 (Navy)	RDCM-91-C-44
85.	Motor, Rocket, 2.25", Mk3 (Navy)	RDCM-91-C-44

SECRET

Picatinny Arsenal (Cont'd)

Ammunition Item No.	Nomenclature	Lot No.
86.	Rocket, Practice, AT, 2.36" M7A3	WC-87-104
87.	Rocket, Practice, AT, 2.36" M7A3	WC-87-104
88.	Rocket, Practice, AT, 2.36" M7A3	WC-87-104
89.	Rocket, HE, AT, 2.36", M6A3F	WC-10-22
90.	Rocket, HE, AT, 2.36", M6A3F	WC-10-22
91.	Rocket, HE, AT, 2.36", M6A3F	WC-10-22
104.	Flare, Trip, Para., M48	USF-1-83
105.	Flare, Trip, Para., M48	USF-1-83
113.	Fuze, Bomb, Nose, AN-M103A1, w/o Booster	SOP-211-86A
114.	Fuze, Bomb, Nose, AN-M103A1, w/o Booster	SOP-211-86A
115.	Fuze, Bomb, Nose, AN-M103A1, w/o Booster	SOP-211-86A
118.	Fuze, Flare, M.T., M111A2, w/Booster	PA 73-96
119.	Fuze, Flare, M.T., M111A2, w/o Booster	AOP-35-A
120.	Fuze, Flare, M.T., M111A2, w/o Booster	AOP-35-A
121.	Fuze, Flare, M.T., M111A2, w/o Booster	AOP-35-A
125.	Fuze, Bomb, Nose, VT, T51E1, (M166) w/Booster	PA-283-8
126.	Fuze, Bomb, Nose, VT, T51E1, (M166) w/Booster	PA-283-8
127.	Fuze, Bomb, Nose, VT, T51E1, (M166) w/Booster	PA-283-8
128.	Fuze, Bomb, Nose, VT, T51E1, (M166) w/o Booster	PA-283-8
129.	Fuze, Bomb, Nose, VT, T51E1, (M166) w/o Booster	PA-283-8
130.	Fuze, Bomb, Nose, VT, T51E1, (M166) w/o Booster	PA-283-8
137.	Fuze, Bomb, HD, Mk 230, w/o Booster	9
138.	Fuze, Bomb, HD, Mk 230, w/o Booster	9
139.	Fuze, Bomb, HD, Mk 230, w/o Booster	9
143.	Grenade, Hand, C/D T32	KOP 3-P-A
144.	Grenade, Hand, C/D T32	KOP 3-P-A
145.	Grenade, Hand, O., Mk3A1	XOP-22-22415-54
146.	Grenade, Hand, O., Mk3A1	XOP-22-22415-54
148.	Mine, AT, HE, M7, w/o Fuze	IOP-5-12
149.	Mine, AT, HE, M7, w/o Fuze	IOP-5-12
150.	Mine, AT, HE, M4, w/Fuze	LOP 7-97
151.	Mine, AT, HE, M6, w/Fuze	LOP 7-97
152.	Mine, AT, HE, M4, w/o Fuze	PA 14-6
153.	Mine, AT, HE, M4, w/o Fuze	PA-14-6
154.	Charge, Shaped, 15#, M2A3	AP 72
155.	Torpedo, Bangalore, M1A1	AP 261
156.	Torpedo, Bangalore, M1A1	AP 261
157.	Charge, Snake, Demo	EAP-4-39
158.	Charge, Snake, Demo	EAP-4-39
159.	Block, TNT, 1/2 lb.	KHK 45
160.	Block, TNT, 1/2 lb.	KHK 45
161.	Block, Demo, Ind, M2, 2 1/2 lb.	BOP 1-23
162.	Block, Demo, Ind, M2, 2 1/2 lb.	BOP 1-23
163.	Block, Demo, Ind, M3, 2 1/2 lb.	WAB -6-497
164.	Block, Demo, Ind, M3, 2 1/2 lb.	WAB-6-497

SECRET

Picatinny Arsenal (Con't)

Ammunition

Item No.	Nomenclature	Lot No.
165.	Cratering, Expl. Ammonium Nitrate	-----
172.	Cord, Detonating	-----
173.	Cord, Detonating	-----
190.	4.5" S.S. Rocket, Practice M	GOP-41-22
191.	4.5" S. S. Rocket, Practice M	GOP-41-22

Engineer Board, Ft. Belvoir, Va.

Materiel

Item No.	Nomenclature
174.	Detonators, Conc. Type 1, T-1
175.	Detonators, Conc. Type 1, T-1
193.	Chest, Demo, Engr.
194.	Chest, Demo, Engr.
	Galvanometer, Blasting
	Machine, Blasting, 10 Cap

Note: Where an item of ammunition has been mentioned more than once, it indicates that the item was displayed in a different manner for the test.

SECRET

APPENDIX B

SERIAL NUMBERS OF MATERIEL TEST

SAMPLES

388

SECRET

SECRET

SERIAL NUMBERS OF MATERIEL TEST SAMPLES

ITEM NO.	NOMENCLATURE	USS ARKANSAS	USS NEVADA	USS PENNSYLVANIA	USS SARATOGA
1	Carbine, Cal. .30, M2	7133127	6912314	6913435	6973741
2	Gun, Machine, Cal. .30, M1917A1 w/Mount, M1917A1	122330	321706	320135	308533
3	Gun, Machine, Cal. 50, HB, M2 (From Mount, Multiple, Machine Gun M45)	2098443	2089996	2093754	2096329
4	Gun, Machine, Cal. .50, HB, M2	1578349	525157	1842134	2096377
5	Gun, Machine, Cal. .50, HB, M2	1563694	822285	328163	2093974
6	Gun, Machine, Cal. .50, HB, M2	1878052	2090063	484893	2093908
7	Gun, Machine, Cal. .60, F17E3	78054	78047	78066	78063
8	Gun, Submachine, Cal. .45, M3A1	716169	716121	635887	703324
9	Helmet, Steel, M1				
10	Holster, Pistol, M1916				
11	Knife, Trench, M4 w/Scabbard M8A1		not displayed		
12	Launcher, Rocket, 2.36", M9E2	113	114	112	111

389
SECRET

SECRET

ITEM NO.	DESCRIPTION	USS ARKANSAS	USS NEVADA	USS PENNSYLVANIA	USS SARATOGA
13	Pistol, Automatic, Cal.45, M1911A1	1335713	1676694	982690	1335210
14	Rifle, Browning Automatic, M1918A2	528315	100400	26937	527244
15	Rifle, Recoilless, 75mm, M20, Note 1	226	222	244	223
16	Rifle, US, Cal..30, M1C	3344986	3347992	3345034	3348113
17	Shotgun, 12 gauge, Riot Type, w/lug	935645	985015	992577	934567
18	Gun, Automatic, 20mm, M3	26010	25997	25937	25974
19	Gun, 75mm, AC, M10 w/Mount M10 and Feed Mechanism M4 Note 2	12	27	6	11
20	Parachaision, M9A2				
21	Parachest, M8A1				
22	Gun, 40mm, M1, w/Mount Gun, 40mm, AA, M2A1	20150	7509	15957	14992
23	Gun, 90mm, AA, M2, w/Mount Gun, 90mm, AA, M2	473	1490	1945	1916
24	Gun, 155mm, M2, w/Carriage Gun, 155mm, M1	1540	2140	705	1236
25	Howitzer, 105mm, M2A1, w/Carriage, Howitzer, 105mm, M2A2	4759	5373	2680	9426
26	Launcher, Rocket, 4.5", T66E2 Complete	195	194	244	282

390
SECRET

SECRET

ITEM NO.	CONCILIATION	USS ARIZONA	USS NEVADA	USS PENNSYLVANIA	USS SARATOGA
27	Mortar, 81mm, M1 w/Mount/ 61mm M4	30637	30633	707	30572
28	Binocular, M15A1	26108	26985	26085	26077
29	Circle, Aiming, M1	14764	22755	22753	17909
30	Clock, Message Center, M1	413116	419138	414376	419819
31	Director, M7A1M1	1460	1452	1636	1625
32	Director, M8A2, w/Trailer M14 Note 3	823	369	819	821
33	Finder, Height, M1A1 Note 4	909	721	1970	199
34	Finder, Range, M7	4048	4060	4058	4052
35	Mount, Periscope, T-107 (From Tank, Light, M24)		1068		
36	Mount, Telescope, M2A1, v/Instr. Light (From Carriage, Howitzer, 105mm, M2A2)	3503	2463	7445	2630
37	Mount, Telescope, M65 (From Tank, Light, M24) Note 5	5753	6349	5010	5723
38	Oil Gear, M3, Elevation (From Carriage, 40mm, AA, M2A1)	31168	25276	13103	25213
39	Periscope, M4A1 (From Appropriate Vehicle)	none displayed	none displayed		

391
SECRET

SECRET

ITEM NO.	NOMENCLATURE	USS ARKANSAS	USS NEVADA	USS PENNSYLVANIA	USS SARATOGA
40	Quadrant, Elevation, M9 (GMC, M35)	70397	71615	70365	74429
41	Quadrant, Gunners, M1, Comp. w/ Gase (From Carriage, Gun Motor, M36)	124884	154954	154027	105334
42	Quadrant, Range, M4 (From Carriage, Howitzer, 105mm M2A2)	18218	20572	18238	18261
43	Sight, M4 (From Mortar, 81mm M2)	92936	92939	15862	29784
44	Sight, Computing, M7A1 (From Carriage, Gun, 40mm, M2A1)	6184	6773	13543	6291
45	System, Cable, M1				
46	Telescope, M7A (From Tank Light, M24)	36063	29970	20166	29649
47	Telescope, T108B2	413	398	925	901
48	Telescope, BC, M65	5957	5082	5969	7128
49	Telescope, Elbow, M7 (From Finder, Height, M1)	909	721	1970	192
50	Telescope, Elbow, M16A1 w/ Mount & Instrument Light (From Carriage, 105mm Howitzer, M2A2)	15276	19710	15301	7128
51	Telescope, Panoramic, M12 (From Carriage, Gun, 155mm)	39359	38308	39411	39414
52	Unit, Generating, M7A1, w/ Trailer, M7	436	112	1409	109

392

SECRET

SECRET

ITEM NO.	DESCRIPTION	USS ARKANSAS	USS NEVADA	USS PENNSYLVANIA	USS SARATOGA
53	Watch, Pocket, Railroad Type	08-270	0E-100	0E-1881	17416
54	Watch, Wrist	00-22826	25694	00-44503	12875
55	Car, Armored, Light, M8	8759	10537	UAK65945	B5055
56	Carriage, Motor, Multiple Gun M16	1119	283401	1734	1916
57	Carriage, Motor, 90mm Gun, M36	1495	4046293	2707	64210
58	Carriage, Cargo, M290 (Amphibian)	12897	12871	13254	12852
59	Tank, Heavy, M26	2081	2097	318	1861
60	Tank, Light, M24	5891	5931	5872	4150
61	Truck, 1/4-Ton, 4x4	28487	86216	195806	189501
62	Truck, Amphibian, 2-1/2-Ton 6x6 (GMC Model DUKW-353)	263-19284	353- 900	353-16949	19839
63	Truck, Auto Repair, 2-1/2-Ton 6x6, M8A1	187299-2	187866-2	127695	187664
	Note 1-Model T-25-USS SARATOGA Note 2-Model T-13 Feed Mechanism USS SARATOGA Note 3-Model M9A1-USS NEVADA, Note 4-Model M1-USS ARKANSAS Note 5-Model T-94 USS PENNSYLVANIA and USS NEVADA				

SECRET

APPENDIX C

**LIST OF PHOTOGRAPHS NOT APPEARING IN
THE REPORT**

**394
SECRET**

SECRET

List of Photographs Not appearing in the Report

USS ARKANSAS

Materiel
Item No. Photographs

33	BA-CR94-467-1
19	" " -2
32	" " -3
31	" " -4
-	" " -6
-	" " -7
-	" " -8
63	AA-CR62-1870-2
23	AA-CR62-1874-11
23	AA-CR62-1875-1
26	" " -3
-	AA-CR94-2002-1
33	" " -6
-	AA-CR94-2017-6
-	AA-CR94-2018-3
-	" " -5
-	" " -6
62	AA-CR94-2105-5
56	" " -7
52	" " -8
32	AA-CR94-2106-7
62	BA-CR192-4132-2
56	" " -3
56	" " -4
26	" " -5
26	" " -6
45	" " -7
45	" " -8
52	" " -9
57	BA-CR70-4133-6
57	" " -8
-	BA-CR70-4134-1
56	BA-CR70-4133-12
31	BA-CR70-4134-2
55	" " -3
55	" " -4
32	" " -5
23	" " -7
23	" " -8
24	BA-CR69-4135-9
32	" " -11
-	BA-CR83-4144A-1
-	BA-CR83-4144A-2
60	BA-CR83-4144-3
-	BA-CR83-4144A-3

USS ARKANSAS

Materiel
Item No. Photographs

33	BA-CR83-4144-4
-	BA-CR83-4144A-4
"	BA-CR83-4144-5
-	BA-CR83-4144-6
-	" " -7
58	" " -11
61	" " -12

USS SARATOGA

-	BA-CR79-458-1
-	" " -2
2	" " -3
19	" " -7
32	" " -8
-	" " -9
27	" " -10
20	" " -11
56	" " -12
63	BA-CR94-468-13
62	BA-CR94-469-1
56	" " -2
59	" " -4
60	" " -5
57	" " -6
61	" " -7
61	" " -8
24	" " -9
57	" " -10
59	" " -11
23	" " -12
-	BA-CR71-1581-12
20	BA-CR71-1582-1
21	BA-CR71-1582-1
32	" " -2
23	" " -3
59	BA-CR69-4136-1
26	" " -2
58	" " -6
63	" " -7
56	" " -9
55	" " -10
60	" " -11
57	" " -12
32	BA-CR69-4137-8

SECRET

USS SAPATOGA

Materiel
Item No. Photographs

52	BA-CR69-4137-10
25	" " -11
25	" " -12
22	BA-CR69-4142-1
22	" " -2
19	" " -3
33	" " -4

USS NEVADA

59	AA-CR71-127-7
-	BA-CR94-467-11
31	BA-CR94-468-1
56	" " -3
56	" " -4
-	" " -5
-	" " -7
61	" " -8
58	" " -10
-	" " -11
-	AA-CR79-1974-1
-	" " -3
44	AA-CR71-2026-5
56	" " -7
31	" " -8
62	AA-CR94-2106-10
52	AA-CR71-2107-3
-	" " -12
19	BA-CR70-4138-1
63	" " -2
-	AA-CR94-2108-7
-	" " -8
24	BA-CR70-4138-7
33	" " -8
25	" " -9
31	" " -10
56	" " -11
61	" " -12
22	BA-CR70-4139-1
59	" " -4
32	" " -5
32	" " -6
52	" " -7
52	" " -9
23	" " -11
55	BA-CR70-4141-1

USS NEVADA

Materiel
Item No. Photographs

60	BA-CR70-4141-2
58	" " -3

USS PENNSYLVANIA

24	BA-CR94-118-1
24	" " -2
45	" " -3
45	" " -4
52	" " -5
19	" " -6
19	" " -8
19	" " -9
19	" " -10
59	" " -11
22	" " -12
-	BA-CR79-459-2
-	" " -3
20	" " -4
21	" " -4
55	" " -6
19	" " -7
19	" " -8
19	" " -9
19	" " -10
59	" " -11
57	BA-CR79-460-1
-	BA-CR94-548-1
-	" " -2
-	" " -3
-	" " -4
33	" " -5
60	" " -6
24	" " -7
24	" " -8
32	" " -9
57	" " -10
59	" " -11
22	" " -12
52	AA-CR81-1664-6
63	" " -7
63	" " -8
63	" " -9
63	" " -10
63	" " -11
58	" " -12

SECRET

USS PENNSYLVANIA

LST 546

Material

Item No. Photographs

21	BA-CR79-1798-2
24	" " -3
24	BA-CR79-1798-5
24	" " -6
55	BA-CR-4859-1
59	" " -2
56	" " -3
22	" " -4
33	" " -6
24	" " -7
25	BA-CR-4860-1
57	" " -3
56	" " -4
22	" " -6
63	" " -7
63	" " -8
62	" " -10
62	" " -11
55	" " -12
26	BA-CR-4861-1
23	" " -3
23	BA-CR-4861-4
57	" " -5
32	" " -6
32	" " -7
59	" " -8
58	" " -9
61	" " -10
61	" " -11
25	" " -12

USS NEVADA

-	BA-CR70-4141-8
-	" " -9
-	" " -11
-	" " -12

USS SARATOGA

-	BA-CR69-4137-2
---	----------------

USS ARKANSAS

-	BA-CR70-4133-1
-	" " -3
-	" " -4
-	BA-CR69-4135-2

Ammunition

Item No. Photographs

1	BA-CR94-1836-2
2	BA-CR94-1836-2
3	BA-CR94-1836-2
4	BA-CR94-1836-2
5	BA-CR94-1836-2
6	BA-CR94-1836-2
7	BA-CR94-1836-2
8	BA-CR94-1836-2
9	BA-CR94-1836-2
10	BA-CR94-1836-2
12	BA-CR94-1836-2
13	BA-CR94-1836-3
14	BA-CR94-1836-3
15	BA-CR94-1836-3
16	BA-CR94-1836-3
17	BA-CR94-1836-3
18	BA-CR94-1836-3
19	BA-CR94-1836-3
20	BA-CR94-1836-2
21	BA-CR94-1836-2
22	BA-CR94-1836-3
23	BA-CR94-1836-3
26	BA-CR94-1836-3
27	BA-CR94-1836-8
30	BA-CR94-1836-8
33	BA-CR94-1836-8
36	BA-CR78-1834-7
37	BA-CR78-1834-3
38	BA-CR78-1834-3
39	BA-CR94-1836-3
40	BA-CR94-1836-3
41	BA-CR94-1836-4
42	BA-CR94-1836-10
43	BA-CR94-1836-11
44	BA-CR78-1834-2
45	BA-CR78-1834-3
46	BA-CR78-1834-2
47	BA-CR78-1834-2
48	BA-CR78-1834-5
49	BA-CR94-1836-11
50	BA-CR94-1836-11
51	BA-CR94-1836-10
52	BA-CR94-1836-4
53	BA-CR94-1836-4
54	BA-CR94-1836-4
55	BA-CR94-1836-11
56	BA-CR94-1836-11
57	BA-CR94-1836-11

SECRET

LST 545

Ammunition
Item No. Photographs

58	BA-CR94-1836-4
59	BA-CR94-1836-4
60	BA-CR94-1836-4
61	BA-CR94-1836-11
62	BA-CR94-1836-11
63	BA-CR94-1836-11
64	BA-CR94-1836-4
65	BA-CR94-1836-4
66	BA-CR94-1836-4
67	BA-CR94-1836-4
68	BA-CR94-1836-4
69	BA-CR94-1836-4
70	BA-CR94-1836-12
71	BA-CR94-1836-12
72	BA-CR94-1836-11
73	BA-CR94-1837-1
74	BA-CR94-1837-1
75	BA-CR94-1836-12
76	BA-CR94-1836-5
77	BA-CR94-1836-5
78	BA-CR94-1836-5
79	BA-CR94-1837-1
80	BA-CR94-1836-5
81	BA-CR78-1834-9
82	BA-CR78-1834-9
84	BA-CR94-1837-1
85	BA-CR94-1836-12
86	BA-CR94-1837-4
87	BA-CR94-1837-1
88	BA-CR94-1836-12
89	BA-CR78-1834-9
90	BA-CR78-1834-8
91	BA-CR78-1834-8
94	BA-CR78-1834-2
95	BA-CR78-1834-2
96	BA-CR78-1834-2
97	BA-CR78-1834-2
98	BA-CR78-1834-3
99	BA-CR78-1834-1
100	BA-CR78-1834-5
101	BA-CR78-1834-5
103	BA-CR78-1834-3
105	BA-CR78-1834-1
107	BA-CR78-1834-1
110	BA-CR94-1837-4
111	BA-CR94-1837-4

LST 545

Ammunition
Item No. Photographs

112	BA-CR94-1837-7
112	BA-CR94-1837-4
113	BA-CR94-1836-5
114	BA-CR94-1836-5
115	BA-CR94-1836-5
116	BA-CR94-1837-2
119	BA-CR94-1836-5
129	BA-CR94-1836-5
121	BA-CR94-1836-5
122	BA-CR94-1836-5
123	BA-CR94-1836-5
124	BA-CR94-1836-6
125	BA-CR94-1837-3
126	BA-CR94-1837-2
127	BA-CR94-1837-4
128	BA-CR94-1836-6
129	BA-CR94-1836-6
130	BA-CR94-1836-6
131	BA-CR94-1836-6
132	BA-CR94-1836-6
133	BA-CR94-1836-6
134	BA-CR94-1837-3
135	BA-CR94-1837-3
136	BA-CR94-1837-2
137	BA-CR94-1836-6
138	BA-CR94-1836-6
139	BA-CR94-1836-6
141	BA-CR78-1834-5
142	BA-CR78-1834-1
143	BA-CR78-1834-8
144	BA-CR78-1834-8
145	BA-CR78-1834-9
146	BA-CR78-1834-9
147	BA-CR94-1836-6
148	BA-CR78-1834-9
149	BA-CR78-1834-9
150	BA-CR78-1840-1
151	BA-CR78-1840-1
152	BA-CR78-1834-10
153	BA-CR78-1834-10
154	BA-CR78-1834-10
155	BA-CR78-1834-12
156	BA-CR78-1834-12
157	BA-CR78-1834-8
158	BA-CR78-1834-7
159	BA-CR78-1834-10

SECRET

LST 545

Ammunition
Item No. Photographs

160	BA-CR78-1834-10
161	BA-CR78-1834-10
162	BA-CR78-1834-10
163	BA-CR78-1840-1
164	BA-CR78-1840-1
165	BA-CR78-1840-1
166	BA-CR78-1840-2
167	BA-CR78-1840-2
168	BA-CR78-1840-2
169	BA-CR78-1840-1
171	BA-CR78-1840-1
172	BA-CR94-1836-7
173	BA-CR94-1836-7
174	BA-CR94-1836-7
175	BA-CR94-1836-7
186	BA-CR94-1836-7
187	BA-CR94-1836-7
188	BA-CR94-1836-7
189	BA-CR94-1836-7
190	BA-CR78-1840-2
191	BA-CR78-1840-2
192	BA-CR94-1837-4
195	BA-CR94-1840-3

LST 661

25	BA-CR62-1558-1
26	BA-CR62-1558-1
27	BA-CR79-124-2
28	BA-CR79-124-2
29	BA-CR79-124-2
42	BA-CR62-1559-6
43	BA-CR62-1559-7
89	BA-CR79-125-4
90	BA-CR79-125-5
91	BA-CR79-125-6
96	BA-CR79-1796-3
97	BA-CR79-1796-3
98	BA-CR79-1795-12
99	BA-CR79-1795-12
113	BA-CR62-1558-9
114	BA-CR62-1558-9
115	BA-CR62-1558-9
119	BA-CR62-1558-10
120	BA-CR62-1558-10
121	BA-CR62-1558-10
140	BA-CR79-1796-9

LST 661

Ammunition
Item No. Photographs

141	BA-CR79-1795-9
147	BA-CR62-1559-3
155	BA-CR79-1794-7
156	BA-CR79-1794-7
157	BA-CR79-1794-8
158	BA-CR79-1794-8
172	BA-CR62-1559-4
173	BA-CR62-1559-4
174	BA-CR62-1559-5
175	BA-CR62-1559-5
186	BA-CR79-124-1
187	BA-CR79-124-1
188	BA-CR79-124-1
189	BA-CR79-124-1
193	BA-CR79-125-2
194	BA-CR79-125-2

LST 52

33	BA-CR94-966-4
34	BA-CR94-966-4
39	AA-CR98-1969-12
40	AA-CR98-1969-12
42	BA-CR94-966-4
75	BA-CR94-966-8
81	BA-CR78-1550-7
82	BA-CR78-1550-8
84	BA-CR94-966-8
85	BA-CR94-966-8
92	BA-CR94-968-1
93	BA-CR94-968-1
102	BA-CR94-968-2
103	BA-CR94-968-2
104	BA-CR94-968-2
105	BA-CR94-968-2
106	BA-CR94-968-1
107	BA-CR94-968-1
139	BA-CR78-1550-5
140	BA-CR94-967-11
141	BA-CR94-968-1
142	BA-CR94-967-3
143	BA-CR78-1550-10
144	BA-CR78-1550-10
145	BA-CR78-1550-10
146	BA-CR78-1550-10
147	BA-CR78-1550-5
148	BA-CR78-1550-10

SECRET

LST 52

Ammunition
Item No. Photographs

149	BA-CR78-1550-10
150	BA-CR94-967-5
151	BA-CR94-967-5
152	BA-CR78-1550-10
153	BA-CR78-1550-10
154	BA-CR78-1550-11
155	BA-CR78-1550-12
156	BA-CR78-1550-12
165	BA-CR78-1550-11
172	BA-CR78-1550-5
173	BA-CR78-1550-5
174	BA-CR78-1550-5
175	BA-CR78-1550-5
190	BA-CR94-967-2
191	PA-CR94-967-2
195	BA-CR94-967-7
-	AA-CR98-1970-5
-	BA-CR94-968-11

YOG 83

14	BA-CR94-119-6
15	BA-CR94-119-6
16	BA-CR94-119-6
37	BA-CR78-1551-4
46	BA-CR78-1551-4
66	BA-CR78-1552-1
57	BA-CR78-1552-1
68	BA-CR78-1552-1
69	BA-CR78-1552-1
73	AA-CR58-1981-7
82	AA-CR98-1973-4
99	BA-CR94-119-4
101	BA-CR94-119-4
103	BA-CR94-119-4
141	BA-CR94-119-6
-	AA-CR98-1973-9

LST 220

36	BA-CR71-126-7
44	BA-CR71-126-7
86	BA-CR71-100-12
87	BA-CR71-100-12
102	BA-CR71-126-6
142	BA-CR71-126-3
159	BA-CR71-126-1
190	BA-CR71-126-3
195	BA-CR71-126-4

LST 220

Ammunition
Item No. Photographs

-	BA-CR71-99-9
-	BA-CR71-99-6
-	BA-CR71-99-11
-	BA-CR71-99-5
-	BA-CR71-99-12
-	BA-CR71-100-2
-	BA-CR71-100-3
-	BA-CR71-100-1
-	BA-CR71-99-7
-	BA-CR71-99-8
-	BA-CR71-99-10
-	BA-CR71-100-4
-	BA-CR71-100-5

400
SECRET

SECRET

APPENDIX D

MASTER DATA LIST FOR AMMUNITION DISPLAY

401
SECRET

ITEM NO	QTY	DESCRIPTION	UNIT	REMARKS	DATE	BY	REMARKS	DATE	BY
1	1	1000	1000						
2	1	1000	1000						
3	1	1000	1000						
4	1	1000	1000						
5	1	1000	1000						
6	1	1000	1000						
7	1	1000	1000						
8	1	1000	1000						
9	1	1000	1000						
10	1	1000	1000						
11	1	1000	1000						
12	1	1000	1000						
13	1	1000	1000						
14	1	1000	1000						
15	1	1000	1000						
16	1	1000	1000						
17	1	1000	1000						
18	1	1000	1000						
19	1	1000	1000						
20	1	1000	1000						
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28	1	1000	1000						
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36	1	1000	1000						
37	1	1000	1000						
38	1	1000	1000						
39	1	1000	1000						
40	1	1000	1000						
41	1	1000	1000						
42	1	1000	1000						
43	1	1000	1000						
44	1	1000	1000						
45	1	1000	1000						
46	1	1000	1000						
47	1	1000	1000						
48	1	1000	1000						
49	1	1000	1000						
50	1	1000	1000						
51	1	1000	1000						
52	1	1000	1000						
53	1	1000	1000						
54	1	1000	1000						
55	1	1000	1000						
56	1	1000	1000						
57	1	1000	1000						
58	1	1000	1000						
59	1	1000	1000						
60	1	1000	1000						
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98	1	1000	1000						
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100	1	1000	1000						

RESTRICTED

Total 179 test items
incl 21 finger stones
67 different items,
11 were finger stones

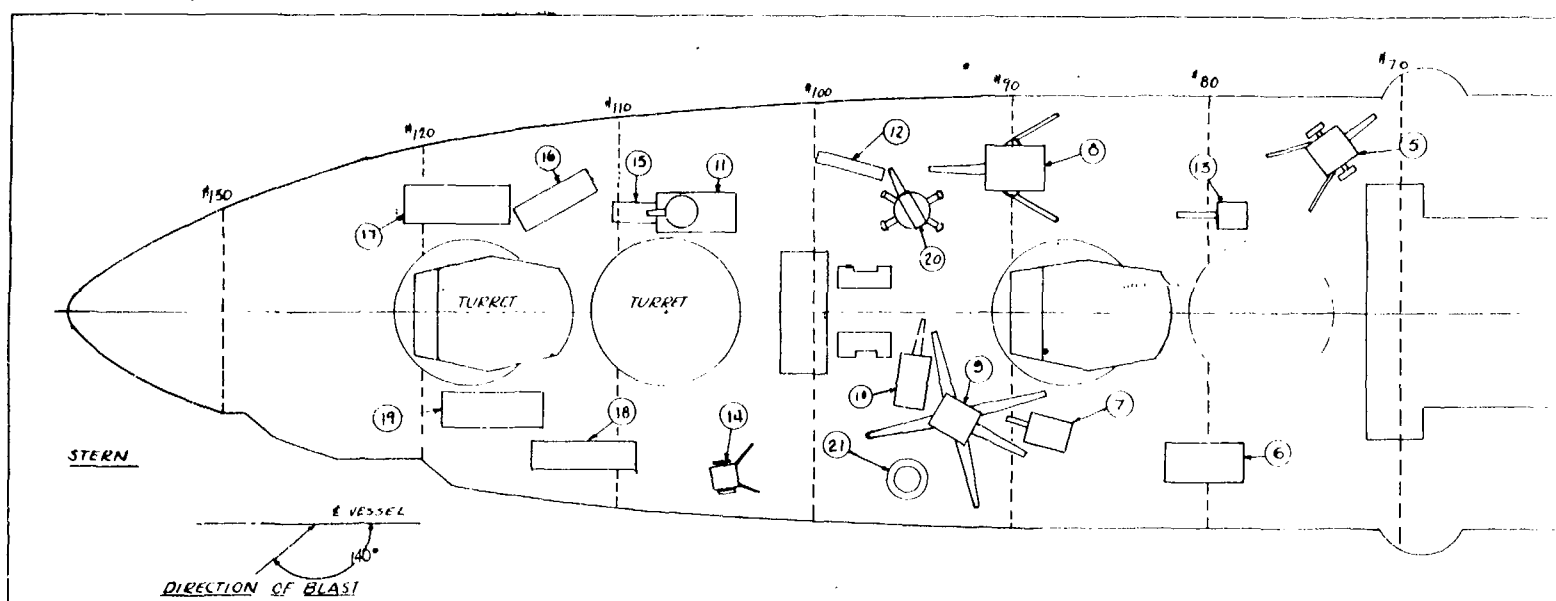
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APPENDIX E

DISPLAY DRAWINGS OF TARGET SHIPS

403
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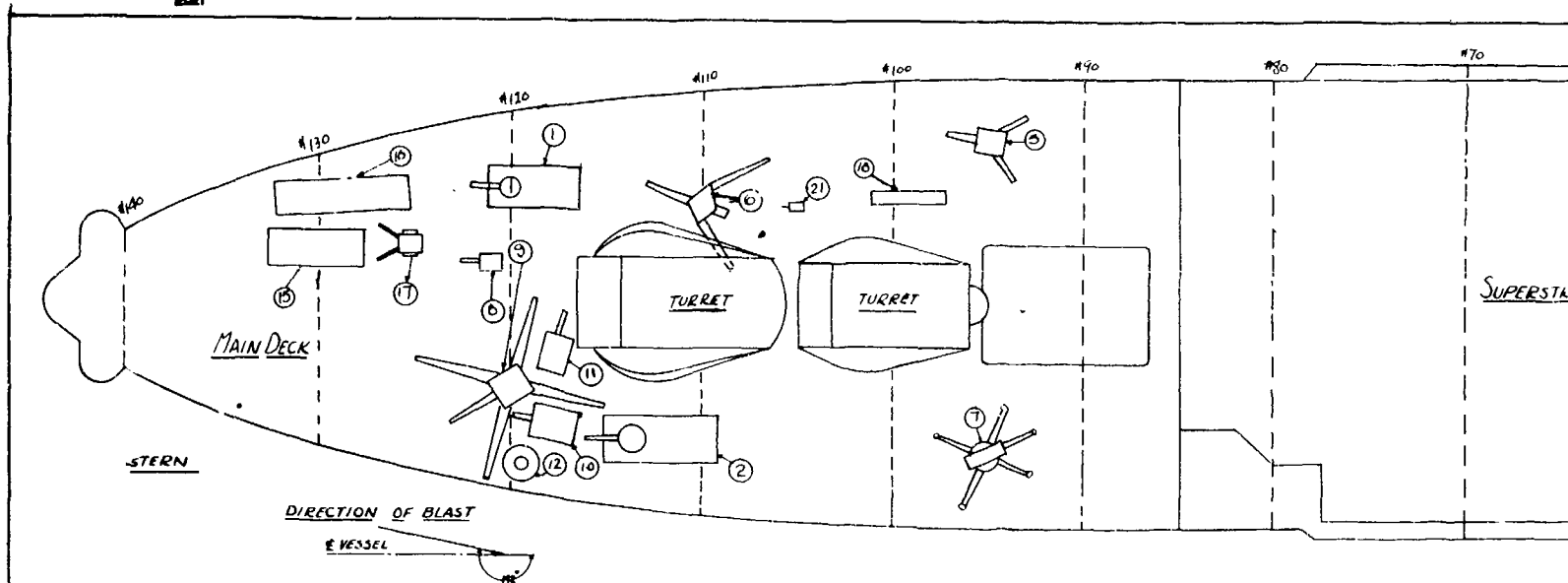


LOCATION OF ORDNANCE EQUIPMENT ABOARD BB-33

NO.	DESCRIPTION	DECK	FRAMES	SIDE	NO.	DESCRIPTION	DECK	FRAMES	SIDE	NO.	DESCRIPTION	DECK	FRAMES	SIDE
1	TANK M26	MAIN	24-30	P	7	DIRECTOR M9A1	MAIN	87-90	S	13	75 ^{MM} A.C. GUN M10	MAIN	80	
2	90 ^{MM} MOTOR CARRIAGE M36	"	21-33	S	8	155 ^{MM} GUN CARRIAGE M1	"	86-95	P	14	ROCKET LAUNCHER T66E2	"	103-105	
3	SMALL MISCL. EQUIP.	"	36-40	S	9	90 ^{MM} AA GUN MOUNT M2	"	88-98	S	15	1/4 TON TRUCK 4X4	"	108-111	
4	DIRECTOR M7A1B1	"	35-36	S	10	GENERATOR SET M7	"	94-98	S	16	CARGO CARRIER M29C	"	113-117	
5	105 ^{MM} HOWITZER	"	72-77	P	11	TANK M14	"	104-108	P	17	AUTO REPAIR TRUCK M9A1	"	116-121	
6	LIGHT ARMORED CAR M8	"	77-83	S	12	HEIGHT FINDER M7	"	96-100	P	18	HALF TRACK M16	"	109-115	

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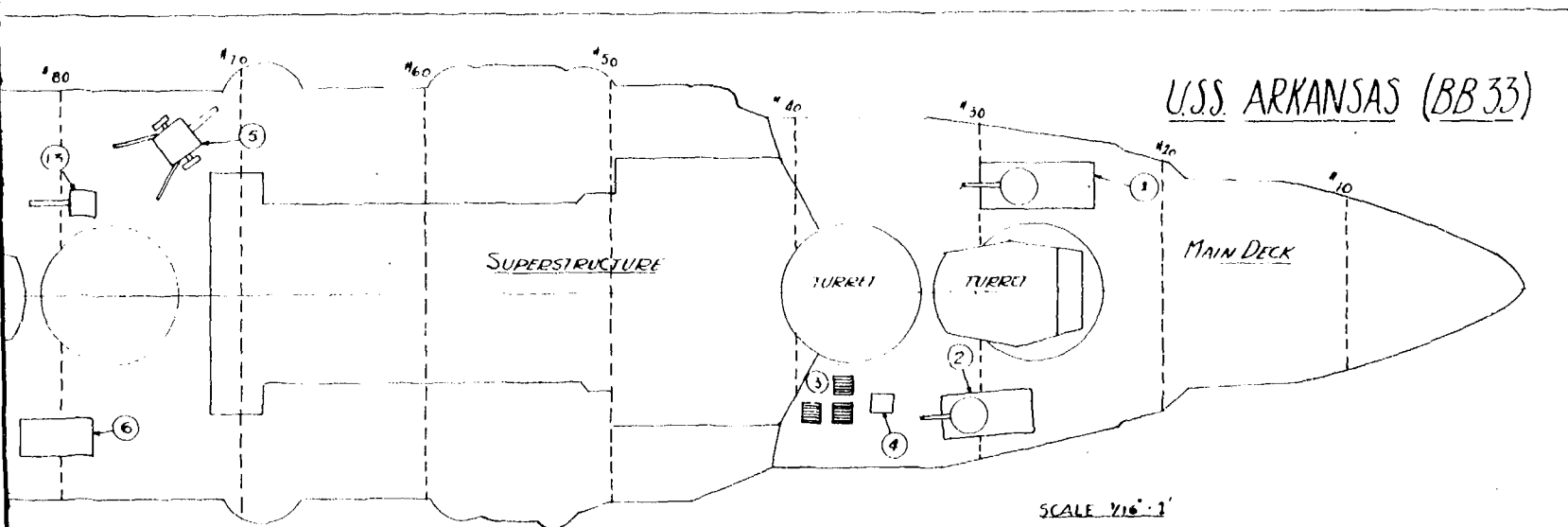
SECRET



LIST OF ORDNANCE EQUIPMENT ABOARD BB-36

NO.	DESCRIPTION	DECK	FRAMES	SIDE	NO.	DESCRIPTION	DECK	FRAMES	SIDE	NO.	DESCRIPTION	DECK	FRAMES	SIDE	NO.
1	90 ^{MM} MOTOR CARRIAGE M36	MAIN	116-121	P	6	155 ^{MM} GUN M1A1	MAIN	110	P	11	GENERATING UNIT M1A1	MAIN	117 1/2	S	16
2	M26 TANK	"	109-115	S	7	40 ^{MM} GUN M2A2	"	95	S	12	CABLE SYSTEM M1	"	119 1/2	S	17
3	M24 TANK	UPPER	38	S	8	75 ^{MM} GUN (AC) M10	"	121	P	13	1/4 TON TRUCK 4X4	UPPER	40	P	18
4	HALF TRACK M16	"	42-46	P	9	90 ^{MM} GUN (AA) M2	"	120	S	14	CARGO CARRIER M29C	"	43	S	19
5	105 ^{MM} HOWITZER M2A2	MAIN	95	P	10	DIRECTOR M9A1	"	111	S	15	TRUCK AUTO REPAIR M9A1	MAIN	130	P	20

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NT ABOARD BB33

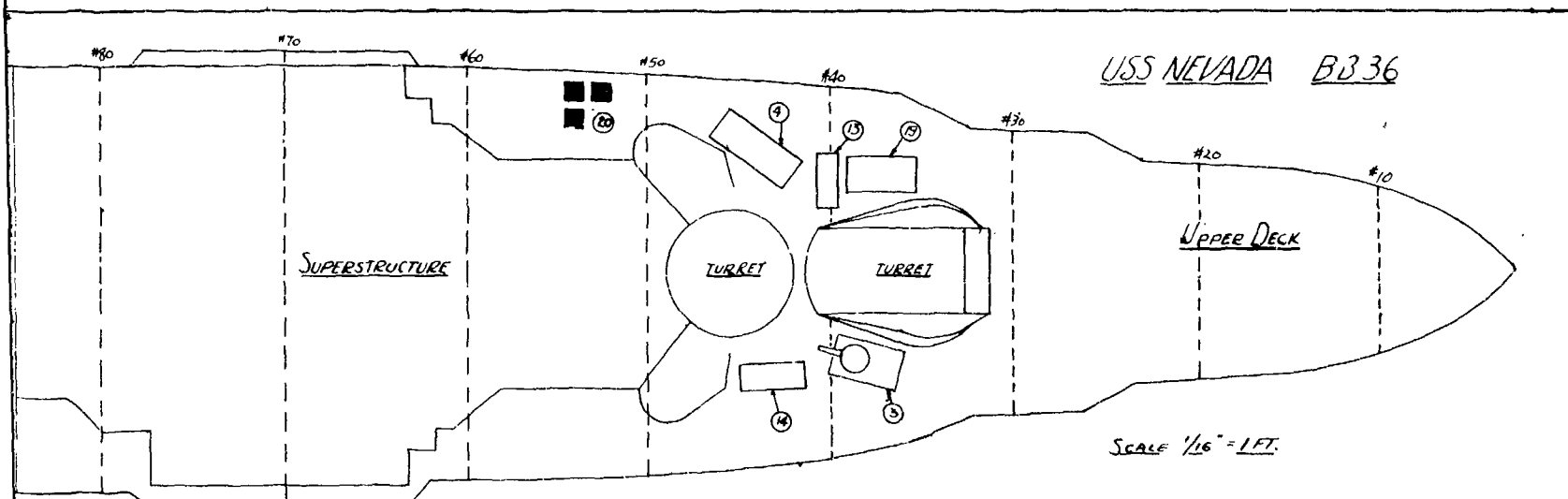
DESCRIPTION	DECK	FRAMES	SIDE	NO.	DESCRIPTION	DECK	FRAMES	SIDE
14.5 GUN M10	MAIN	80	F	19	2 1/2 TON TRUCK (AMPHIB.)	MAIN	114-120	S
ROCKET LAUNCHER T66E2	"	103-105	S	20	40 MM GUN CARRIAGE	"	96-98	P
4X4 TRUCK	"	108-111	P	21	CABLE SYSTEM M1	"	96-98	S
GO CARRIER M29C	"	113-117	P					
REPAIR TRUCK M8A1	"	116-121	P					
4X4 TRUCK M16	"	109-115	S					

JOINT TASK FORCE 1
TASK UNIT 1.4.3 (ORD.)

SK-1

gmm

404



B-36

DESCRIPTION	DECK	FRAMES	SIDE	NO.	DESCRIPTION	DECK	FRAMES	SIDE
GO UNIT M1A1	MAIN	117 1/2	S	16	2 1/2 TON AMPHIBIAN TRUCK	MAIN	128	P
ITEM M1	"	119 1/2	S	17	45" ROCKET LAUNCHER	"	125	P
4X4 TRUCK	UPPER	90	P	18	HEIGHT FINDER M1	"	100	P
CARRIER M29C	"	93	S	19	LIGHT ARMORED CAR M8	UPPER	37	P
REPAIR M8A1	MAIN	130	P	20	SPECIAL MISC. EQUIPMENT	"	52	P

NO.	DESCRIPTION	DECK	FRAMES	SIDE
21	81 1/4" MORTAR	MAIN	109-100	P

JOINT TASK FORCE ONE
TASK UNIT 1.4.3 ORD.

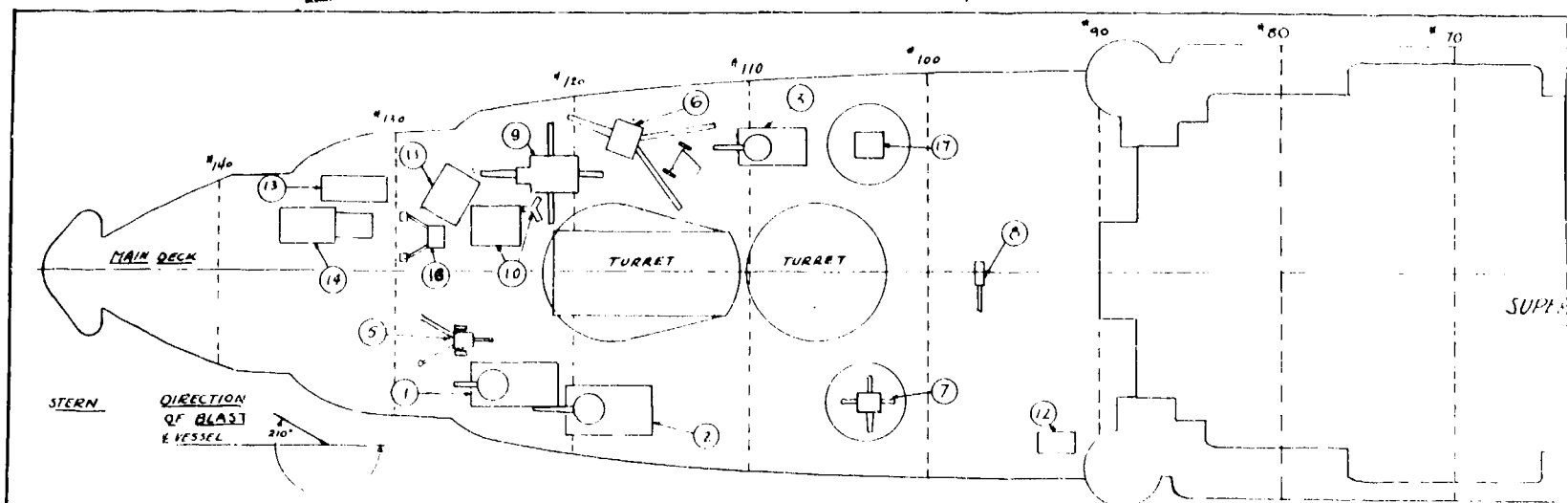
SK-2

gmm

405

2

SECRET

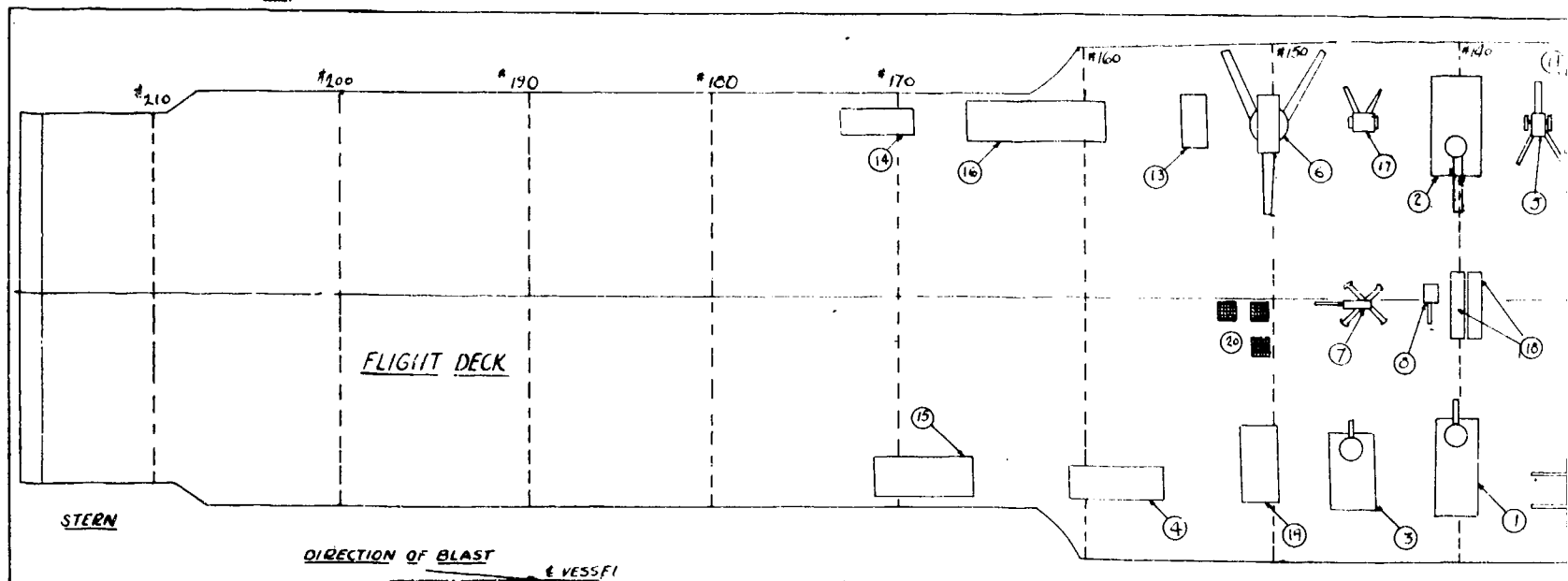


LOCATION OF ORDNANCE EQUIPMENT ABOARD BB-38

NO.	DESCRIPTION	DECK	FRAME	SIDE	NO.	DESCRIPTION	DECK	FRAME	SIDE	NO.	DESCRIPTION	DECK	FRAME	SIDE	NO.	DESCRIPTION
1	90 MM MOTOR CARRIAGE M36	MAIN	121	S	6	155 MM GUN CARRIAGE M1A1	MAIN	112-121	P	11	GENERATING UNIT M7A1	MAIN	125-129	P	16	45 CALIBER 2A
2	TANK M26	"	116	S	7	40 MM A.A. GUN M2A1	"	102-105	S	12	1/4 TON TRUCK 4x4	"	90-94	S	17	HEIGHT FINDER
3	TANK M24	"	107-111	P	8	75 MM A.A. GUN M10	"	97-98	E	13	CARGO CARRIER M29C	"	130-135	P	18	LIGHT ARMOR
4	HALF TRACK M16	UPPER	31	S	9	90 MM A.A. GUN M12	"	118-126	P	14	TRUCK AUTO REPAIR M8A1	"	131-137	P	19	SMALL MISC.
5	105 MM HOWITZER CARRIAGE M2A2	MAIN	125-129	S	10	DIRECTOR M9A1 & TRACKER	"	123-126	P	15	2 1/2 TON TRUCK AMPHIB. 6x6	UPPER	31-39	P		

SECRET

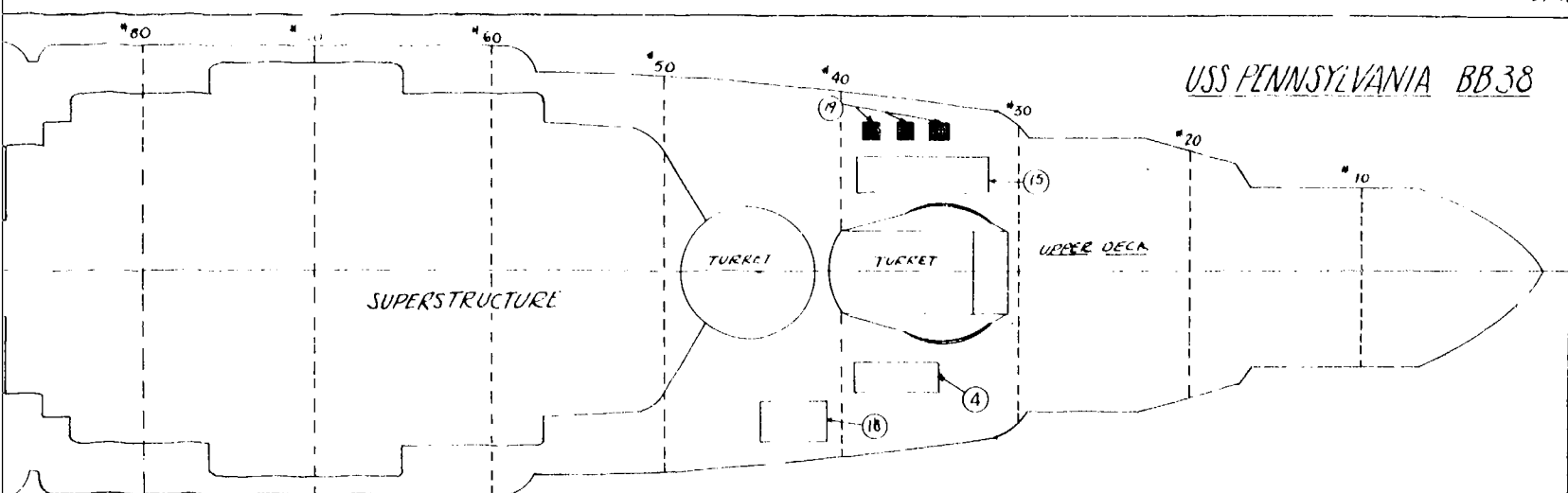
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LOCATION OF ORDNANCE EQUIPMENT ABOARD CV-3

NO.	DESCRIPTION	DECK	FRAME	SIDE	NO.	DESCRIPTION	DECK	FRAME	SIDE	NO.	DESCRIPTION	DECK	FRAME	SIDE	NO.	DESCRIPTION
1	90 MM GUN CARRIAGE M36	FLIGHT	140	S	6	155 MM GUN M1A1	FLIGHT	150	P	11	GENERATING UNIT M7A1	FLIGHT	155	P	16	2 1/2 TON
2	TANK M26	"	140	P	7	40 MM A.A. GUN M2A1	"	145	E	12	CABLE SYSTEM M2	"	151	P	17	2 1/2 TON
3	TANK M24	"	145	S	8	75 MM A.A. GUN M10	"	141 1/2	E	13	1/4 TON TRUCK 4x4	"	155	P	18	HEIGHT
4	HALF TRACK M16	"	157	S	9	90 MM A.A. GUN M12	"	150	P	14	CARGO CARRIER M29C	"	170	P	19	ARMOR
5	105 MM HOWITZER M2A2	"	155 1/2	P	10	DIRECTOR M9A1	"	126	P	15	TRUCK REPAIR M8A1	"	167	S	20	MISC.

SECRET



ABOARD BB38

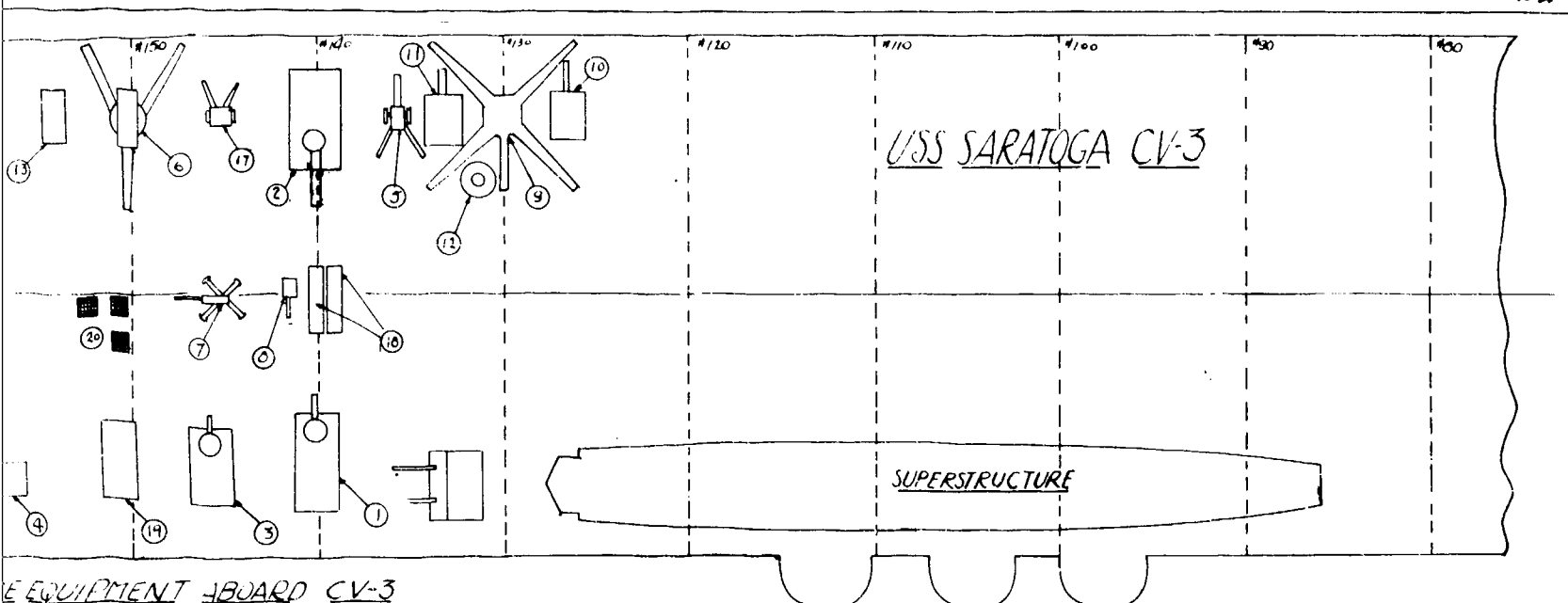
N	DECK	FRAMES	SIDE	NO	DESCRIPTION	DECK	FRAMES	SIDE
MTA1	MAIN	15-119	P	16	45 AKKRET LAUNCHER T662	MAIN	127-130	P
"	"	5-94	S	17	HEIGHT FINDER "71"	"	102-104	P
"729 C	"	150-135	P	18	LIC. AT ARMORED CAR MO	UPPER	40-45	S
IR1 M8A1	"	131-137	P	19	SMALL MISC EQUIP.	"	39-45 1/2	P
CHIB 616	UPPER	51-39	P					

SCALE 1/16" = 1 FT.

JOINT TASK FORCE ONE
TASK UNIT 1.43 (ORD)

5K-3

SPN



EQUIPMENT ABOARD CV-3

DESCRIPTION	DECK	FRAME	SIZE	NO	DESCRIPTION	DECK	FRAME	SIZE
LIFTING UNIT M1A1	FLIGHT	133	P	16	2 1/2 TON AMPHIB. TRUCK	FLIGHT	162	P
SYSTEM M2	"	131	P	17	4.5" ROCKET LAUNCHER	"	145	P
TRUCK 4x4	"	155	P	18	HEIGHT FINDER M1	"	140	E
CARRIER M29C	"	170	P	19	ARMORED CAR M8	"	150	S
REPAIR M8A1	"	167	S	20	MISC. EQUIPMENT	"	152	E

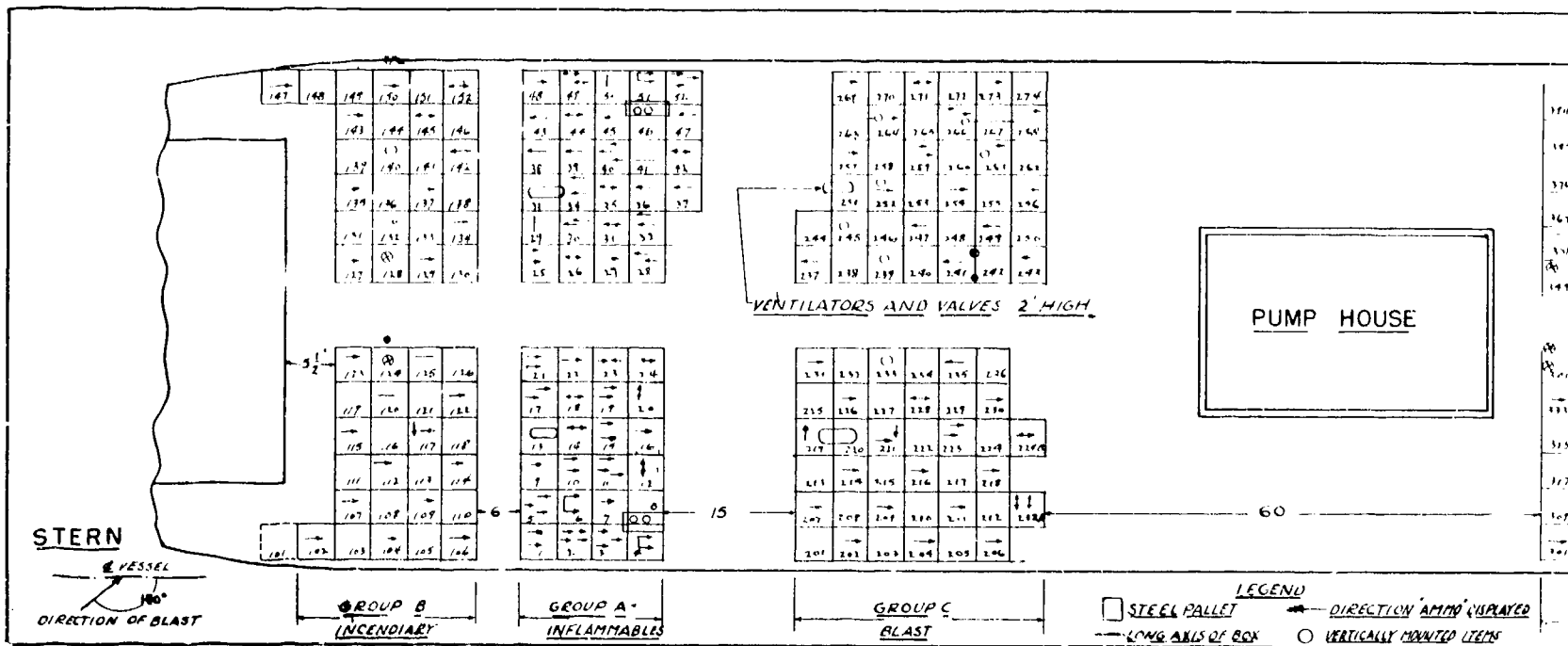
SCALE 1/16" = 1 FT.

JOINT TASK FORCE ONE
TASK UNIT 1.4.3 (ORD.)

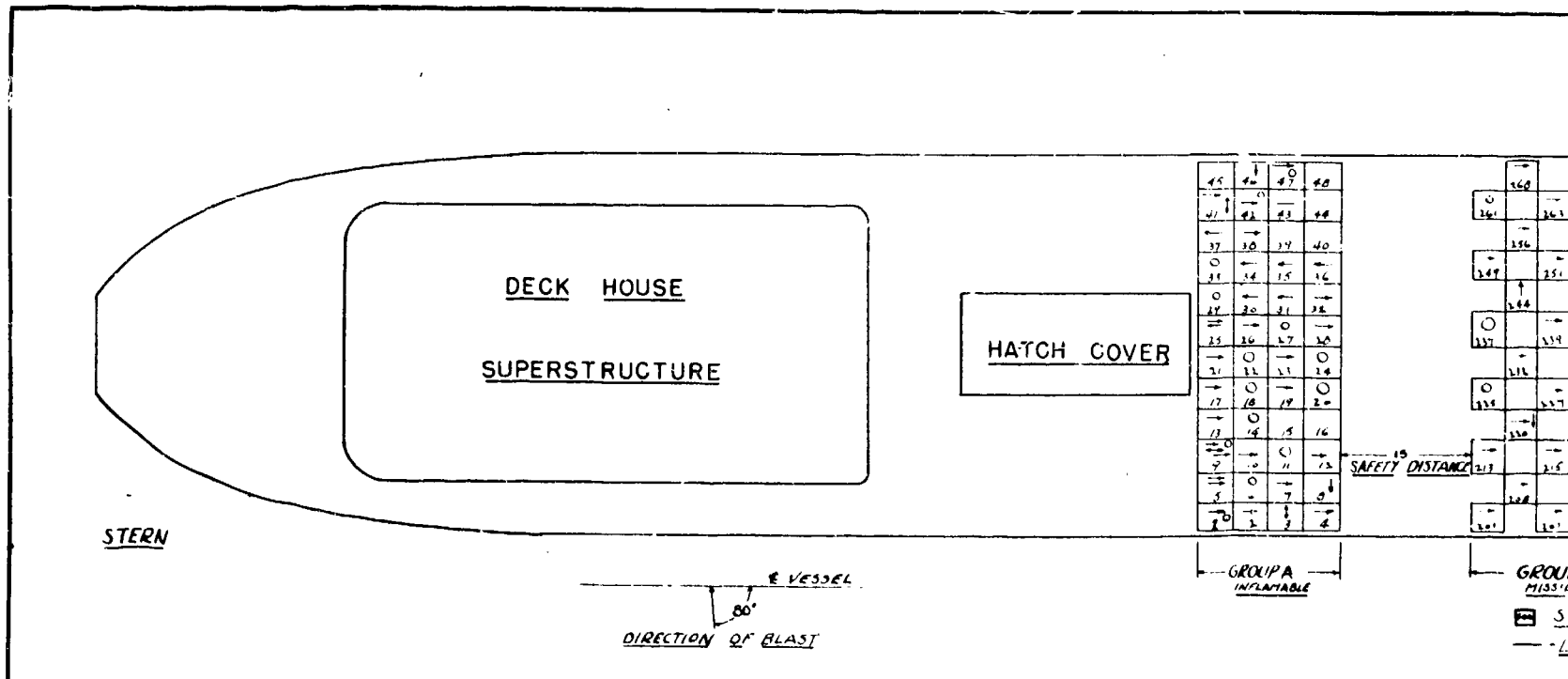
SK - 4

5/30

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MAIN DECK LAYOUT YOG-83

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364	365	366	367	368	369	370	371	372

RUBBER SAMPLES DISPLAYED ON CATWALK

1R	2R	3R	4R	5R	6R	7R	8R	9R	10R
----	----	----	----	----	----	----	----	----	-----

PUMP HOUSE

60

LEGEND
EL PALLET
SKIS OF BOX
DIRECTION AMMO DISPLAYED
VERTICALLY MOUNTED ITEMS

GROUP D
MISSILES

JTF-1
TASK UNIT 143

SK: 5

MAIN DECK LAYOUT

LST-52

45	46	47	48
49	50	51	52
53	54	55	56
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61	62	63	64
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97	98	99	100

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200	201	202

SAFETY DISTANCE

SAFETY DISTANCE

SAFETY DISTANCE

GROUP A
INFLATABLE

GROUP C
MISSILE

LEGEND

GROUP D
BLAST

GROUP B
INCENDIARY

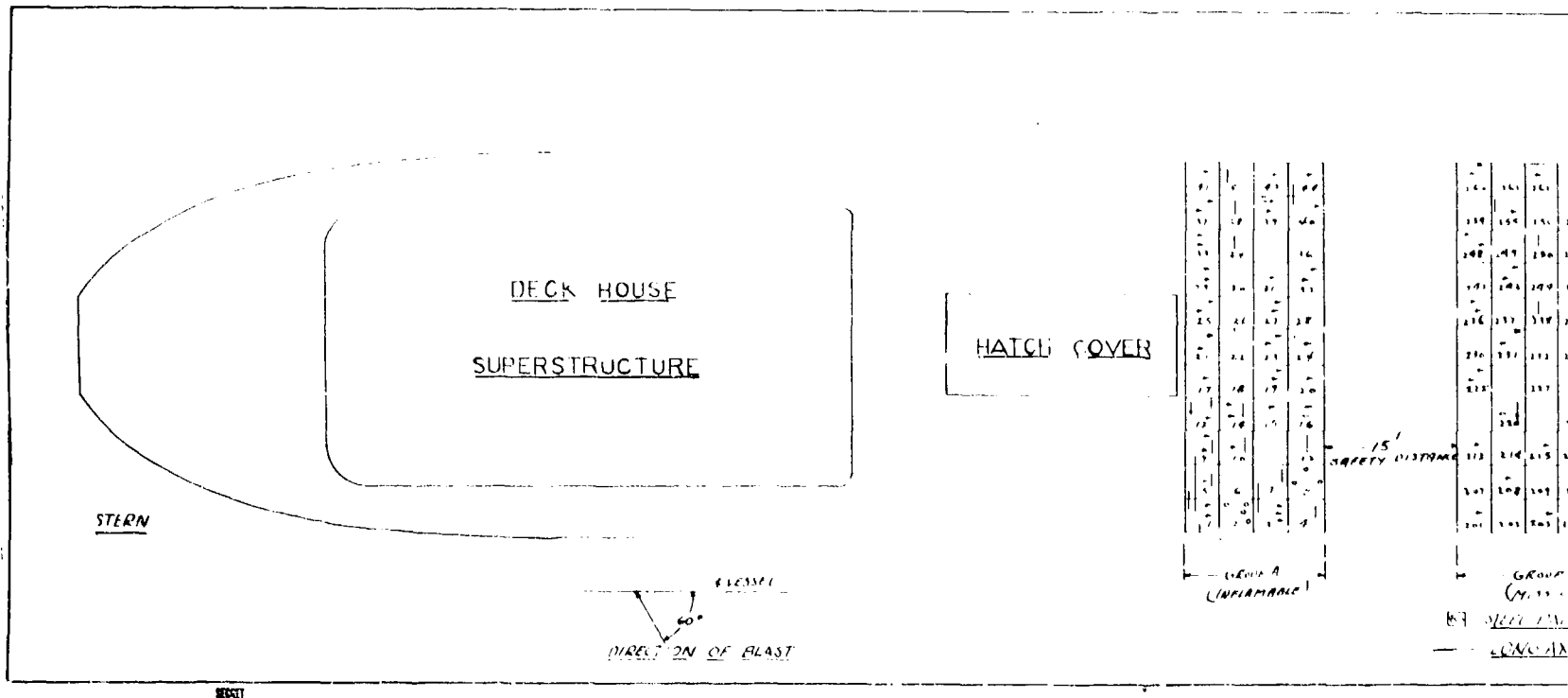
STEEL PALLET #NO.
LONG AXIS OF BOX
DIRECTION AMMO DISPLAYED
VERTICALLY MOUNTED ITEMS

JTF-1
T.U. 143

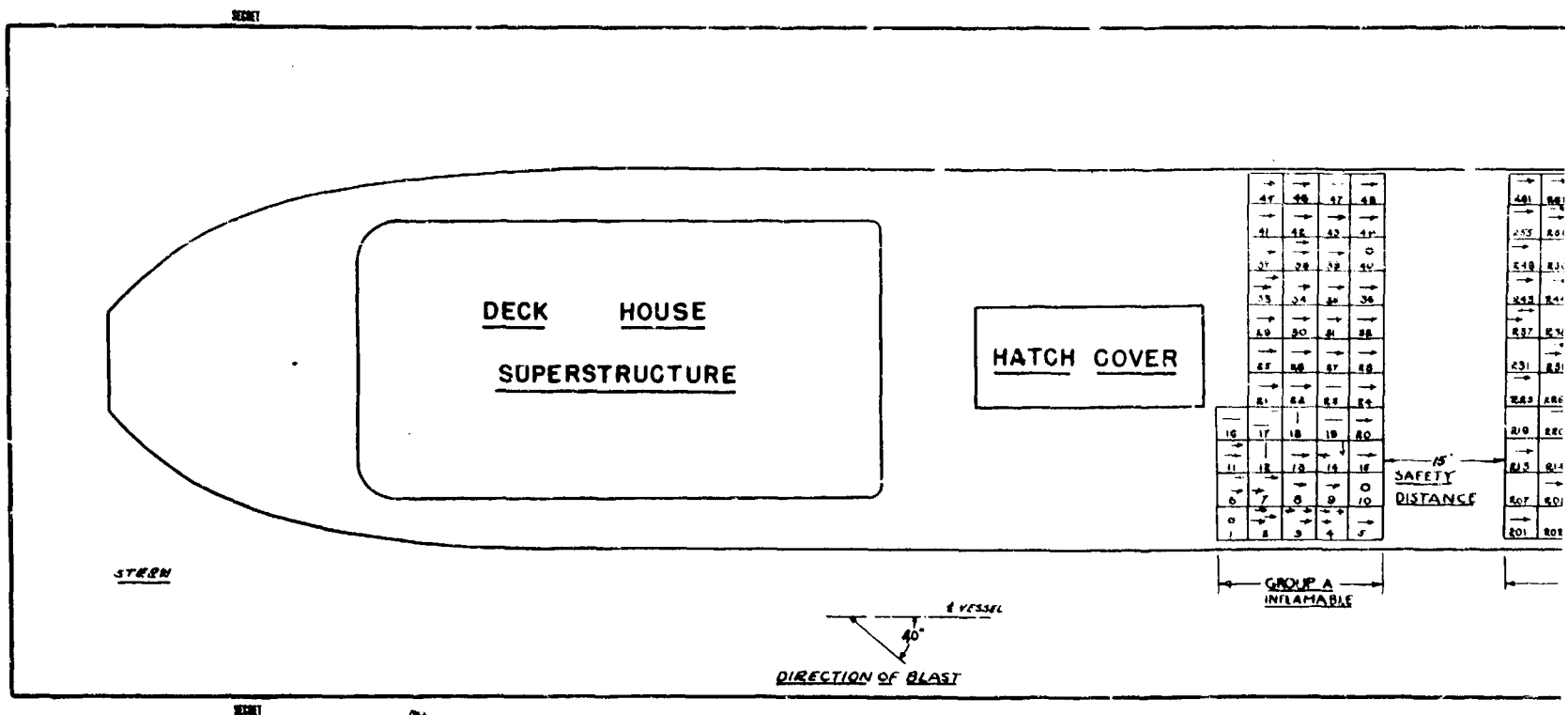
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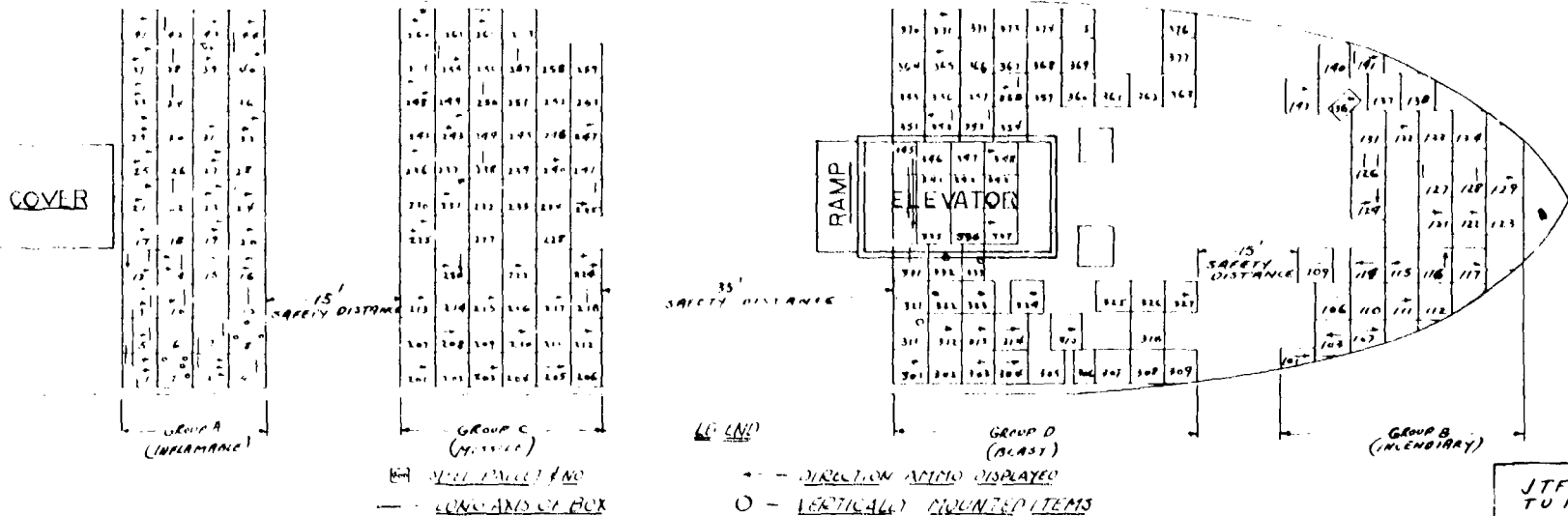


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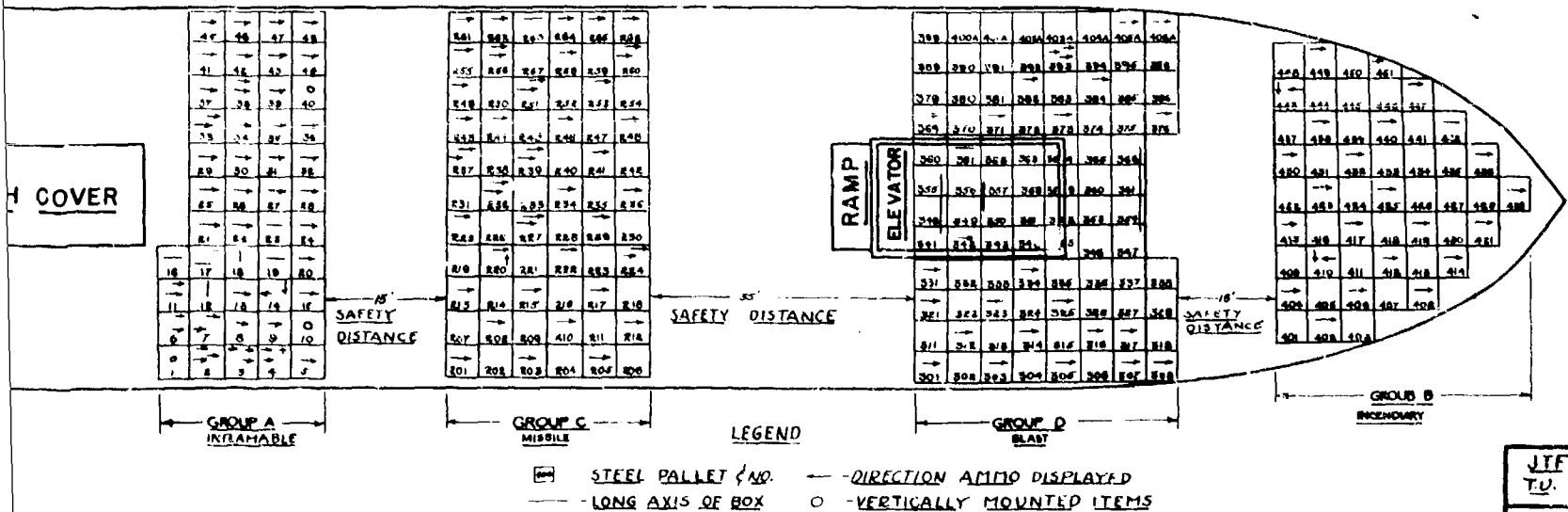
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MAIN DECK LAYOUT LST - 661



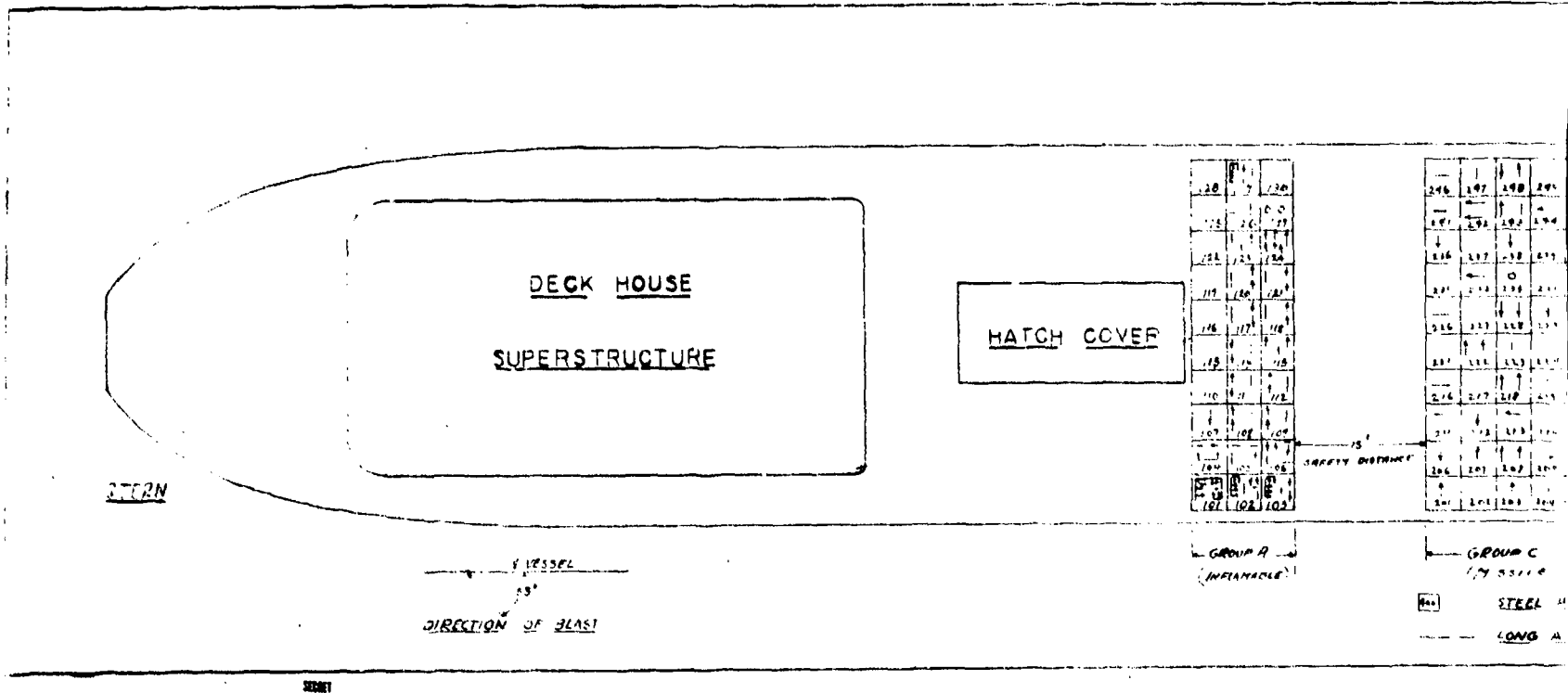
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MAIN DECK LAYOUT LST 220

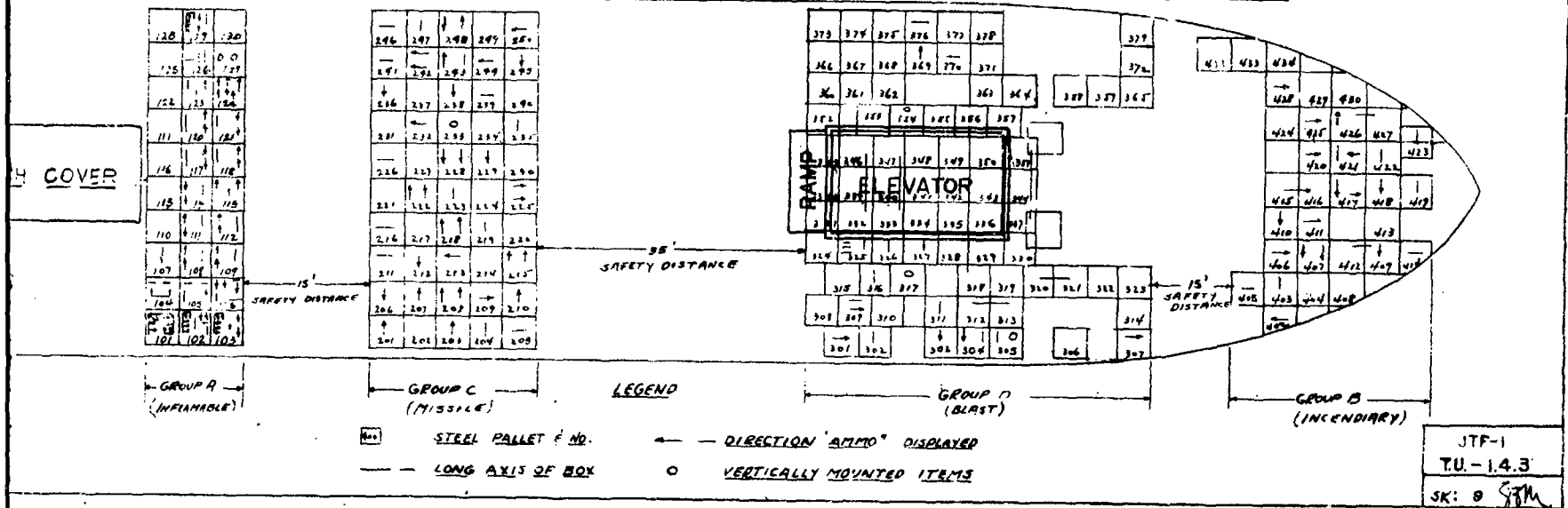


411

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MAIN DECK LAYOUT LST - 545



2

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APPENDIX F

MASTER LIST OF TEST BAKER MATERIAL

413
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MASTER LIST OF TEST BAKER MATERIEL

Item No.	Serial No.	Nomenclature	Where Displayed	
			Test Baker	Test Able
22	14992	Gun, 40mm AA, M1, w/mount Gun, 40mm AA, M2A1	LST 125	SARATOGA
22	15927	Gun, 40mm AA, M1, w/mount Gun, 40mm AA, M2A1	LCT 812	PENNSYLVANIA
23	1945	Gun, 90mm AA, M2, w/mount Gun, 90mm AA, M2	LCT 1113	PENNSYLVANIA
24	1236	Gun, 155mm, M2, w/carriage Gun, 155mm, M1A1	Bikini Island	ARKANSAS
25	9426	Howitzer 105mm, M2A1 w/carriage Howitzer 105mm, M2A2	LCT 412	SARATOGA
25	9680	Howitzer 105mm, M2A1 w/carriage Howitzer 105mm, M2A2	LST 545	PENNSYLVANIA
26	282	Launcher, Rocket 4.5", T66E2	LST 125	PENNSYLVANIA
26	244	Launcher, Rocket 4.5", T66E2	LCT 1113	SARATOGA
27	107	Mortar, 81mm complete	LCT 812	PENNSYLVANIA
27	30572	Mortar, 81mm complete	LCT 412	SARATOGA
52	109	Unit, Generating, M7A1 w/trailer M7	LCT 412	SARATOGA
55	10537	Car, Armored, Light M8	LCT 1187	NEVADA
55	65945	Car, Armored, Light M8	LST 125	PENNSYLVANIA
55	B5055	Car, Armored, Light M8	Bikini Island	SARATOGA
56	1916	Carriage, Motor, Gun Multiple, M16	LCT 1113	SARATOGA
56	1734	Carriage, Motor, Gun Multiple, M16	LST 125	PENNSYLVANIA
56	283401	Carriage, Motor, Gun Multiple, M16	LCT 812	NEVADA

SECRET

Item No.	Serial No.		Where Displayed	
			Test Baker	Test Able
58	13254	Cargo Carrier, M290	Bikini Island	PENNSYLVANIA
61	195806	Truck, 1/4 Ton, 4x4 C&R	LST 545	PENNSYLVANIA
61	189581	Truck, 1/4 Ton, 4x4 C&R	Bikini Island	SARATOGA
62	35316919	Truck, Amphibian, 2 1/2 Ton 6x6 (DUKW) Anchored off	Bikini 300 yds	PENNSYLVANIA
62	19389	Truck, Amphibian, 2 1/2 Ton 6x6 (DUKW)	Bikini Island	SARATOGA
63	187664	Truck, Automotive Repair 2 1/2 Ton 6x6, M8A1	Bikini Island	SARATOGA

SECRET

APPENDIX G

TEST BAKER MATERIEL ON MAJOR SHIPS

416
SECRET

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TEST BAKER MATERIEL ON MAJOR SHIPS

Item No.	Serial No.	Nomenclature	Where Displayed
23	1916	Gun, 90mm, AA, M2 w/Mount Carriage	SARATOGA
24	705	Gun, 155mm, M2 w/Carriage	PENNSYLVANIA
24	1235	" " "	SARATOGA
45		System Cable M1	SARATOGA
57	1495	Carriage, Gun Motor, 90mm, M36	ARKANSAS
57	4046293	" " "	NEVADA
57	2707	" " "	PENNSYLVANIA
57	64210	Carriage, Gun Motor, 90mm, M36	SARATOGA
59	2081	Tank, Heavy, M26	ARKANSAS
59	2097	Tank, Heavy, M26	NEVADA
59	318	Tank, Heavy, M26	PENNSYLVANIA
59	1861	Tank, Heavy, M26	SARATOGA
60	5931	Tank, Light, M24	NEVADA
60	5872	Tank, Light, M24	PENNSYLVANIA
60	4150	Tank, Light, M24	SARATOGA

SECRET

APPENDIX H

**LOCATION OF TEST BAKER MATERIEL ON
LOTS AND LOTS**

418

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LOCATION OF TEST MAKER EQUIPMENT ON LCTs & LSTs

LST 125

Gun, 40mm, AA, M1 w/Mount Gun, 40mm, AA, M2A1
Car, Armored, Light, M8
Carriage, Gun, Motor Multiple M16
Launcher, Rocket, 4.5", T66E2

LST 545

Howitzer, 105mm, M2A1, w/Carriage, Howitzer, 105mm, M2A2
Truck 1/4 ton 4x4 C&R

LCT 1187

Car, Armored, Light M8
Carrier, Cargo, M29C

LCT 812

Mortar, 81mm, Complete
Gun, 40mm, AA, M1 w/Mount Gun, 40mm, AA, M2A1
Carriage, Gun, Motor Multiple, M16

LCT 1113

Launcher, Rocket, 4.5, T66E2
Carriage, Gun, Motor Multiple M16
Gun, 90mm, AA, M2 w/Mount Gun, 90mm AA, M2

LCT 412

Mortar 81mm, Complete
Howitzer, 105mm, M2A2, w/Carriage Howitzer, 105mm, M2A2
Unit, Generating, M7A1, w/Trailer M7

Note: All equipment was fastened to the deck with cables and turn
buckles.

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APPENDIX I

LAYOUT OF TEST BAKER MATERIAL ON
BIKINI ISLAND

420
SECRET

CONFIDENTIAL

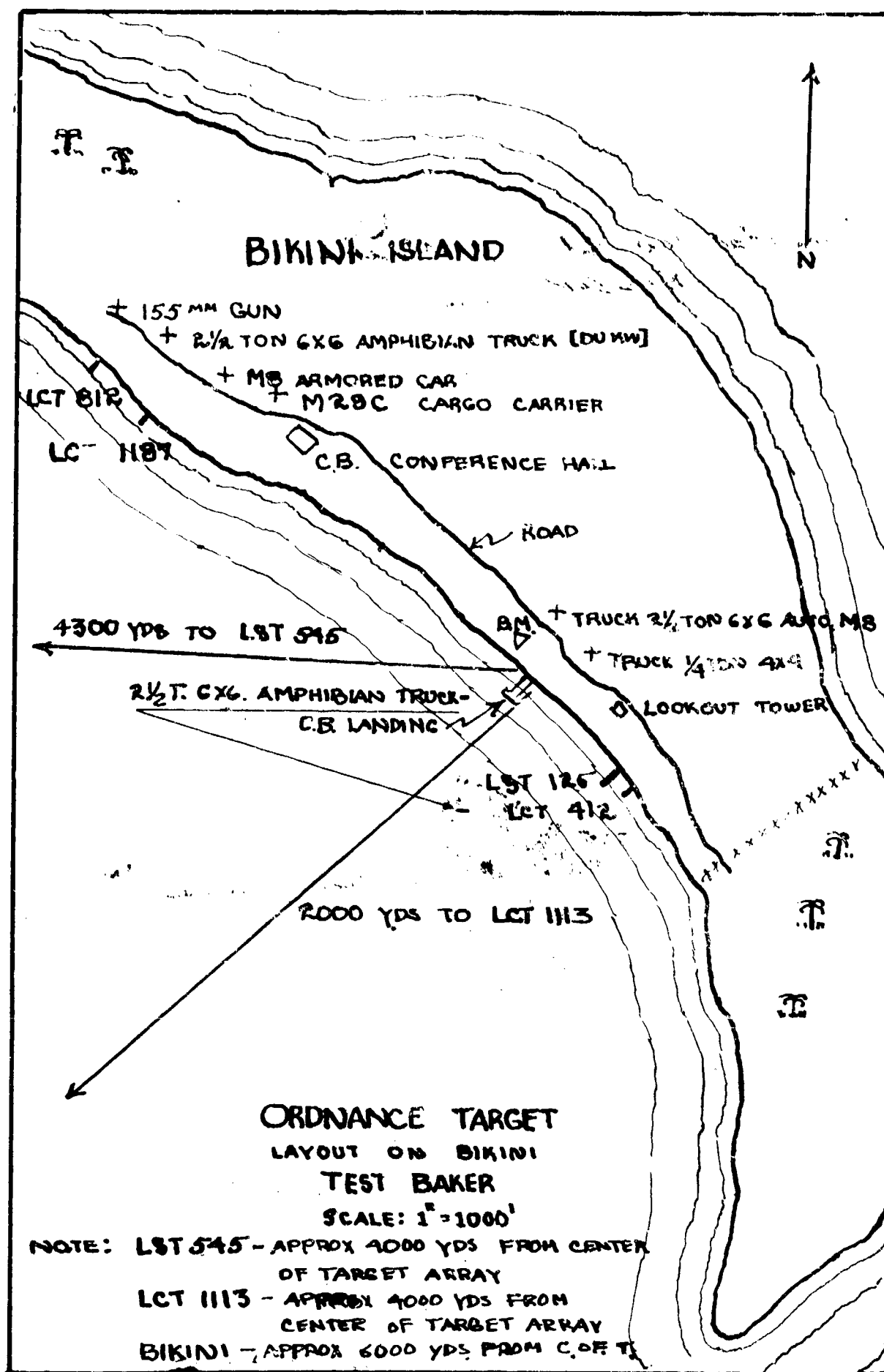
Classification (Cancelled) (Changed to _____)
By Authority of Joint Chiefs of Staff ACTION OF 11 APRIL 1949
By John H. Kegan, Capt. Jg Date 16 Feb 51
AFS:MD

RESTRICTED DATA

ATOMIC ENERGY ACT - 1946

SPECIFIC RESTRICTED DATA CLEARANCE NOT REQUIRED
USE MILITARY CLASSIFICATION SAFEGUARDS

CONFIDENTIAL



CONFIDENTIAL

Classification (Cancelled) (Changed to -----)

By Authority of JOINT CHIEFS OF STAFF ACTION OF 2 APR 11 1949

By John H. Bagg, Lt. Jg. Date 11 Feb 51

RESTRICTED DATA
EXCLUDED FROM AUTOMATIC DOWNGRADING AND DECLASSIFICATION
UNLESS SPECIFICALLY INDICATED OTHERWISE
MILITARY CLASSIFICATION STANDARDS

CONFIDENTIAL



Defense Special Weapons Agency
6801 Telegraph Road
Alexandria, Virginia 22310-3398

TRC

18 April 1997

MEMORANDUM FOR DEFENSE TECHNICAL INFORMATION CENTER
ATTENTION: OMI/Mr. William Bush (Security)

SUBJECT: Declassification of Reports

The Defense Special Weapons Agency has declassified the following reports:

/✓AD-3665884	XRD-203-Section 12✓
x ——— AD-366589✓	XRD-200-Section 9✓
AD-366590✓	XRD-204-Section 13✓
AD-366591✓	XRD-183✓
/✓AD-366586x	XRD-201-Section 10✓
/✓AD-367487x	XRD-131-Volume 2✓
✓✓AD-3675164	XRD-143✓
✓✓AD-367493x	XRD-142✓
AD-801410L✓	XRD-138✓
AD-376831L✓	XRD-83✓
AD-366759✓	XRD-80✓
✓✓AD-376830Lx	XRD-79✓
/✓AD-376828Lx	XRD-76✓
/✓AD-367464x	XRD-106✓
AD-801404L✓	XRD-105-Volume 1✓
/✓AD-367459x	XRD-100✓

TRC

18 April 1997

Subject: Declassification of Reports

✓✓ AD-367517 ✕	XRD-141 ✓
AD-366762 ✓	XRD-84 ✓
AD-366760 ✓	XRD-81 ✓
AD-366761 ✓	XRD-82 ✓
AD-367501 ✓	XRD-158-Volume 1 ✓
AD-367507L ✓	XRD-152-Volume 4 ✓
✓✓ AD-367495 ✕	XRD-184 ✓
✓✓ AD-367485 ✕	XRD-129 ✓
✓✓ AD-367484 ✕	XRD-128 ✓
✓ AD-367483 ✕	XRD-127 ✓
✓ AD-367482 ✕	XRD-126 ✓
AD-367488 ✓	XRD-132
✓ AD-367480 ✕	XRD-124 ✓
AD-801409L ✓	XRD-135 ✓
✓ AD-367490 ✕	XRD-136 ✓
✓ AD-367492 ✕	XRD-137 ✓
AD-801411L ✓	XRD-139 ✓
✓ AD-367518 ✕	XRD-140 ✓
AD-367515 ✓	XRD-144 ✓
AD-367514 ✓	XRD-145 ✓
✓ AD-367468 ✕	XRD-110-Volume 2 ✓
AD-367513 ✓	XRD-146 ✓
✓ AD-367497 ✕	XRD-162 ✓

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18 April 1997

Subject: Declassification of Reports

AD-801406L ✓ XRD-114✓

In addition, all of the cited reports are now **approved for public release; distribution statement "A" now applies.**

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